

**FINAL**

**2012 SEMI-ANNUAL GROUNDWATER  
MONITORING REPORT**

**Joliet Army Ammunition Plant  
Will County, Illinois**

**Submitted to:**



**US Army Contracting Agency  
APG Directorate of Contracting – AEC Team  
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**Submitted by:**



**1480 Ford Street  
Maumee, OH 43537  
(419) 794-3500**

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## ACRONYMS AND ABBREVIATIONS

|                  |  |
|------------------|--|
| ACSIM            | Assistant Chief of Staff for Installation Management                     |
| Army             | United States Army   |
| BRK              | bedrock well   |
| CERCLA           | Comprehensive Environmental Response, Compensation,<br>and Liability Act |
| cm/sec           | centimeters per second   |
| CO <sub>2</sub>  | carbon dioxide   |
| COC              | contaminant of concern   |
| COMBO            | combined overburden/bedrock well   |
| CSM              | conceptual site model  |
| 2,4-DNT          | 2,4-dinitrotoluene   |
| 2,6-DNT          | 2,6-dinitrotoluene   |
| 2-A-4,6-DNT      | 2-amino-4,6-dinitrotoluene   |
| 4-A-2,6-DNT      | 4-amino-2,6-dinitrotoluene   |
| DO               | dissolved oxygen   |
| DVR              | data validation report   |
| February         | February/March quarterly sampling  |
| ft               | foot/feet  |
| ft/day           | feet per day   |
| ft/ft            | feet per foot  |
| ft/yr            | feet per year  |
| FSP              | Field Sampling Plan  |
| GMZ              | Groundwater Management Zone  |
| GOU              | Groundwater Operable Unit  |
| GRU              | Groundwater Remediation Unit   |
| H <sub>2</sub> O | water  |
| HMX              | High Melting-point Explosive   |
| in.              | inch   |
| IAC              | Illinois Administrative Code   |
| IC               | institutional control  |

|          |   |
|----------|---|
| ID/IQ    | Indefinite Delivery/Indefinite Quantity                                   |
| IEPA     | Illinois Environmental Protection Agency                                  |
| J        | estimated concentration   |
| JOAAP    | Joliet Army Ammunition Plant  |
| LAP      | Load-Assemble-Package area  |
| LTM      | long-term monitoring  |
| LTM Plan | Final Long-term Monitoring Plan for Environmental<br>Remediation Services |
| MDL      | method detection limit  |
| MFG      | manufacturing area  |
| mg/L     | milligrams per liter  |
| ml/min   | milliliters per minute  |
| MNA      | monitored natural attenuation   |
| MWH      | MWH Americas, Inc.  |
| MS/MSD   | matrix spike/matrix spike duplicate                                       |
| NB       | nitrobenzene  |
| ND       | not detected  |
| NPL      | National Priority List  |
| 2-NT     | 2-nitrotoluene  |
| OD       | outside diameter  |
| ORP      | oxidation-reduction potential   |
| OU       | operable unit   |
| OVB      | overburden well   |
| PVC      | polyvinyl chloride  |
| QAPP     | Quality Assurance Project Plan  |
| RA       | remedial action   |
| RDX      | Royal Demolition Explosive  |
| RG       | Remedial Goal   |
| RI       | Remedial Investigation  |
| ROD      | Record of Decision  |
| SOU      | Soil Operable Unit  |
| SpC      | specific conductivity   |

|         |   |
|---------|---|
| SQL     | Sample Quantitation Limit                     |
| SVOC    | semi-volatile organic compound                |
| TAL     | target analyte list                           |
| TNB     | 1,3,5-trinitrobenzene                         |
| TNT     | 2,4,6-trinitrotoluene                         |
| TolTest | TolTest, Inc.                                 |
| µg/L    | micrograms per liter                          |
| USACE   | United States Army Corps of Engineers         |
| USAEC   | United States Army Environmental Command      |
| USDA    | United States Department of Agriculture       |
| USEPA   | United States Environmental Protection Agency |
| VOC     | volatile organic compound                     |

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## 1.0 INTRODUCTION

This report has been prepared by TolTest, Inc. (TolTest) in conjunction with teaming partner MWH Americas, Inc. (MWH), for environmental remediation services at the former Joliet Army Ammunition Plant (JOAAP) on behalf of the United States Army Environmental Command (USAEC) Assistant Chief of Staff for Installation Management (ACSIM) under Indefinite Delivery/Indefinite Quantity (ID/IQ) Contract No. W91ZLK-05-D0012, Delivery Order 0001.

This report presents the Spring 2012 (February/March [February] and April) groundwater quality data for the long-term monitoring (LTM) program of the Groundwater Operable Unit (GOU) and landfill inspection documentation for March and April inspections for the Soil Operable Unit (SOU) at JOAAP in response to the *Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas* (U.S. Army, 1998), (ROD) for the JOAAP facility. The remedy that was selected for the GOU Sites at JOAAP was monitored natural attenuation (MNA). As a function of the MNA remedy for the Groundwater Remedial Units (GRUs), LTM is required. This requirement is intended to satisfy three primary objectives:

1. Monitor contaminant concentration reductions and plume migration;
2. Verify containment of contaminant concentrations greater than Remedial Goals (RGs) within the Groundwater Management Zones (GMZs); and
3. Evaluate the effectiveness of SOU remedial actions (RAs) and MNA for the GOU remedy.

These objectives are being met through implementation of the LTM program.

In addition to the GOU, the SOU remedial actions included the construction of three landfills at Sites L3, M11, and M13. Landfill inspections are required quarterly to determine if the remedy continues to function as designed. Post-closure inspection reports for March and April for landfills L3, M11, and M13 are included in Appendix A.

The objective of this report is to provide a data submittal of the groundwater quality sampling results, provide a review of the data collected during spring 2012, and provide documentation of landfill inspections. Additionally, water table and potentiometric surface maps for the March quarterly (Landfill M13) and April semi-annual sampling event are included.

### 1.1 FACILITY DESCRIPTION AND BACKGROUND

Joliet Army Ammunition Plant was a former United States Army (Army) munitions production facility located on approximately 36 square miles (23,542 acres) of land in Will

County, Illinois (Figure 1-1). The former facility is located approximately 60 miles southwest of Chicago and 14 miles south of Joliet, Illinois. As shown on the Groundwater Studies Area Map and Landfill Sites (Figure 1-2), the JOAAP property is divided into two main functional areas: the Manufacturing (MFG) Area, west of Route 53, and the Load-Assemble-Package (LAP) Area, east of Route 53. The facility has been described in detail in Section 1.1 of the *Final Long-term Monitoring Plan for Environmental Remediation Services* (LTM Plan [ToITest/MWH, 2010]).

The MFG Area, covering approximately 14 square miles (9,159 acres), is where the chemical constituents of munitions, propellants, and explosives were produced. The production facilities were generally located in the northern half of the MFG Area. In the southern half of the MFG Area, there was an extensive explosives storage facility. The LAP Area, covering approximately 22 square miles (14,383 acres), is where munitions were loaded, assembled, and packaged for shipping. The LAP Area contained munitions filling and assembly lines, storage areas, and a demilitarization area.

Joliet Army Ammunition Plant was constructed during World War II. The production output varied with the demand for munitions. Although the plant was used extensively during World War II, all production of explosives halted in 1945. At that time, sulfuric acid and ammonium nitrate plants were leased out, and the remaining production facilities were put in layaway status. The installation was reactivated during the Korean War, and again during the Vietnam War. Production gradually decreased until it was stopped completely in 1977.

Hazardous wastes were generated and released into the environment through several pathways. Process waters used in the production and handling of 2,4,6-trinitrotoluene (TNT) and other compounds were discharged into drainage systems. Buildings and equipment were periodically washed to remove explosive residues and the wastewater would be allowed to leach into the ground or flow into the local surface water and creeks. Later, process water incineration or industrial wastewater treatment produced ash or explosives residue that accumulated over time. Ash from the incineration of production by-products was stored in landfills on-site. Equipment and demolition materials were flashed (burned) to remove residues. Fire training areas, used to keep fire and safety personnel suitably prepared, introduced contaminants to the soil and groundwater. Leaks and spills occasionally occurred in the storage and handling of oils and other liquids. Wastes and unusable explosives and munitions were burned or detonated. In addition, munitions were tested, leaving some residuals in the soil at the test sites. Vehicle and equipment maintenance, transformer leaks, and the handling of pesticides introduced further contamination to the soil.

Wastes generated during production activities resulted in environmental contamination at various sites around JOAAP. Because of this contamination, the United States Environmental Protection Agency (USEPA) placed the MFG Area on the National Priority List (NPL) on July 21, 1987 and the LAP Area on the NPL on March 31, 1989.

The contaminated media identified at JOAAP were divided into two operable units (OUs) to aid in the development and evaluation of remedies. The SOU consists of sites where contaminated soils, sediments, and debris were identified. The GOU consists of sites where contaminated groundwater was identified. Surface water was determined to pose no risk to health and the environment and therefore is not addressed further as a contaminated media. However, surface water discharge is a major component of the shallow groundwater system, and localized detections of explosives may occur near contaminated groundwater sites. For this reason, surface water is relevant to the GOU.

Substantial land at JOAAP is not contaminated. Transfer activities for that land have occurred and some are still underway. After remaining potential hazards to human health and the environment are addressed under the SOU and these properties are found suitable for transfer under Public Law 104-106 and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the Army will prepare documentation for transfer.

The Illinois Land Conservation Act of 1995, PL 104-106, Div. B, Title 2901-2932, February 10, 1996, states that the Army will transfer JOAAP land to various federal, local, and state jurisdictions. Transfer of land is occurring incrementally as it is remediated and is deemed appropriate. As of production of this report, the distribution of JOAAP land through these incremental transfers is approximately 17,726 acres to the United States Department of Agriculture (USDA) for establishing the Midewin National Tallgrass Prairie; 982 acres to the Department of Veterans Affairs to establish a Veterans Cemetery; 455 acres to Will County, Illinois to establish the Will County Landfill; and 2,885 acres to the State of Illinois to establish two industrial parks.

Where groundwater contamination is present within areas to be transferred, the Army has included institutional controls (ICs) in the transfer documents to prevent exposure to contaminants, limit groundwater pumping, and prevent manipulation of the natural groundwater flow patterns through any means. These controls will help to limit the spread of the remaining contamination in groundwater and will remain in effect with the land until removed by mutual agreement of the Army, USEPA, Illinois Environmental Protection Agency (IEPA), and the current landowner.

## **1.2 NATURAL ATTENUATION MECHANISMS**

The selected remedial action for the GOU is remediation by natural attenuation. A detailed overview of the physical, chemical, and biological criteria, which are most directly linked to natural attenuation mechanisms and the site-specific criteria used to evaluate natural attenuation at JOAAP is provided in the LTM Plan and annual groundwater monitoring reports where natural attenuation is evaluated and reported.

### **1.3 RECORD OF DECISION REQUIREMENTS**

The ROD specified general groundwater monitoring requirements. These requirements were based on information presented in the Remedial Investigation (RI) Report and did not have the additional information provided by the predesign investigation completed in 1998 or subsequent remedial actions completed at JOAAP. As such, the Army applied subsequent site data as well as historic data to arrive at site-specific LTM locations and analytes, which were included in the LTM Plan.

Based on the objectives presented in Section 1.2 of the LTM Plan and as an extension of the ROD, several types of monitoring are required for each site. These include:

- Collection of groundwater samples to evaluate contaminant concentrations;
- Collection of surface water samples where groundwater discharges to surface features to evaluate surface water contaminant concentrations;
- Collection of depth to water measurements to evaluate groundwater flow;
- Documentation and evaluation of source removal or surface disturbing activities;
- Documentation of changes in surface water features, impoundments, or conveyances; and
- Evaluation of evidence concerning illicit water withdrawal affecting contaminant migration.

### **1.4 LONG-TERM MONITORING PLAN**

Monitoring activities are required pursuant to the decision documents developed for the various contaminated sites found at JOAAP. The LTM Plan was produced to present LTM activities for the GOU and required SOU maintenance activities. The LTM Plan includes activities associated with long-term maintenance of the remedies selected for JOAAP. The objective of the LTM Plan was to provide a sufficiently detailed description of the monitoring strategy and process and to establish realistic expectations for execution of the program on the part of all stakeholders. With respect to the latter objective, it is the intent of the plan to establish both the actions to be taken in the event of various sampling outcomes and the set of conditions required to reduce and eventually discontinue long-term monitoring efforts where practicable. As such, it includes sample collection and analysis of ground and surface water, surveillance of cap maintenance and access restrictions at landfills, and surveillance of land use restrictions and other ICs implemented on an installation-wide basis.

Section 3.1 of the LTM Plan summarizes the GMZs and monitoring well designations and discusses the decision tree for interpretation of groundwater quality results and the logic for

optimizing site monitoring programs. Section 3.2 of the LTM Plan discusses IC monitoring required as part of the MNA remedy.

The LTM program is presented in Section 4.0 of the LTM Plan which includes a discussion of site-specific monitoring programs for the GMZs and landfills, monitoring well installations, abandonments, monitoring schedules, requirements for IC monitoring, and reporting schedules. Tables A1-1 through A1-9 of Appendix A (Field Sampling Plan, [FSP]) of the LTM Plan provide specific information about the monitoring requirements at each site. However, it is expressly presented that the LTM program will likely change with changing conditions. Therefore, the LTM Plan tables were consolidated into a single table that is continually updated based on groundwater monitoring results and periodic reviews. The sampling completed for spring 2012 is presented as Table 1-1 in this report and summarizes the monitoring locations and requisite analyses for those sample locations.

The LTM Plan provides a site-specific evaluation of the natural attenuation remedial option that is being applied to all GOU sites. The purpose of the LTM Plan is to:

- describe the process by which data will be collected and analyzed,
- determine if remedies in place at JOAAP are protective of human health and the environment,
- describe the nature of monitoring results that, if observed, would indicate further action be taken because the remedy does not appear to be sufficiently protective,
- prescribe the conditions under which certain monitoring activities may be terminated, and
- provide a detailed description of activities to monitor the GOU natural attenuation RA.

Section 5 of the LTM Plan describes reporting requirements for LTM activities. The LTM Plan reporting schedule requires the submittal of a semi-annual report, which is a presentation of the results of the winter and spring sampling events with minimal analysis, and an annual report that presents the results of the summer and fall sampling event with detailed evaluation of trends in the groundwater data. The semi-annual sampling schedule identified in the LTM Plan indicates that the sampling periods will generally be January and October of each year at all sites except Landfill M13, which is sampled quarterly, generally in January, April, July, and October of each year. In 2012, the winter quarterly sampling event at Landfill M13 was conducted during February and the spring semi-annual sampling event was conducted in April. Annual groundwater monitoring reports are the venue in which data are analyzed and proposed changes to the LTM Plan are presented. Acceptance of the final annual groundwater monitoring report by regulators will constitute approval of recommended changes in the monitoring program.

The LTM Plan also provides for a five-year review of the GOU natural attenuation remedy and SOU remedy, as required by the ROD. Natural attenuation data were collected during the Fall 2003 sampling event to facilitate the first five-year review. The First Five-Year Review Report was completed following the Fall 2003 sampling event. The Final Second Five-Year Review Reports for the GOU and SOU were submitted in August 2009. Subsequent five-year reviews will be completed to evaluate the effectiveness of the GOU and SOU remedies and, if necessary, provide recommendations to modify the remedy to make it more effective. The Third Five-Year Review Report will have the GOU and SOU remedy protectiveness evaluated in one consolidated document. Furthermore, if the third five-year review suggests that natural attenuation may not result in reasonable agreement with ROD requirements, evaluation of available contingency remedies will be presented as part of the five-year review process.

## **2.0 SITE ACTIVITIES**

This section provides a summary of the LTM Plan requirements, the groundwater monitoring activities at each of the GOU's, and the SOU RA landfill inspections.

### **2.1 GROUNDWATER MONITORING**

This section provides a summary of the field activities undertaken to perform winter and spring quarterly groundwater monitoring at Landfill M13, and spring semi-annual monitoring at remaining GOU and SOU sites. Site L2 was not sampled in Spring 2012 as recommended in the 2009 Annual Report. Site L14 was not sampled in Spring 2012 as recommended in the 2010 Semi-annual Report.

The measurement of water levels at the monitoring wells was conducted using an electronic water level indicator. Depth to water was measured from a datum mark on the top of the well casing at each monitoring well. All measurements were to an accuracy of +/- 0.01 foot (ft).

In accordance with the standard operating procedure for low-flow sampling, monitoring wells were purged and sampled using low flow sampling techniques at a flow rate of approximately 100 to 250 milliliters per minute (ml/min). Dedicated ¼-inch (in.) outside diameter (OD) Teflon™ lined polyethylene tubing is installed in each monitoring well. The Teflon™ lined polyethylene tubing is connected with dedicated silicon tubing to a variable speed peristaltic pump. During purging, the pump discharge tube is attached to a multi-probe water quality meter equipped with a flow-through cell. The water quality meter is equipped with probes for measuring field parameters including temperature, pH, specific conductivity (SpC), oxidation/reduction potential (ORP), and dissolved oxygen (DO). The water quality meters were calibrated daily in accordance with Appendix A (FSP) of the LTM Plan and the manufacturer's instructions.

Measurements of field parameters were taken at 2-minute intervals and recorded on Groundwater/Surface Water Sampling Forms. Final field purge parameters are summarized in Table 2-1. Purging of each monitoring well was considered complete when field parameters stabilized over three successive measurements to within 10%. Upon stabilization of the field parameters, the required samples were collected from the discharge tube of the pump into laboratory-supplied containers after disconnecting the flow-thru cell.

Samples were collected in laboratory supplied preserved containers for explosive compounds in one-liter amber glass bottles; target analyte list (TAL) metals in one-liter, nitric acid preserved polyethylene bottles; inorganic parameters nitrate and sulfate in 250 milliliter unpreserved polyethylene bottles; volatile organic compounds (VOCs) in 40 milliliter, hydrochloric acid preserved glass vials; and semi-volatile organic compounds (SVOCs) in one-liter amber glass bottles. Samples were analyzed by Test America,

University Park, Illinois in accordance with Appendix B – Quality Assurance Project Plan (QAPP) of the LTM Plan. Samples collected for inorganic parameters TAL metals, nitrate, and sulfate were field filtered using high capacity 0.45 micron cartridge filters.

### **2.1.1 February 2012 Monitoring**

TolTest/MWH measured water levels at eleven monitoring wells and sampled eight monitoring wells as summarized in Table 1-1. The first quarterly monitoring event in 2012 at Landfill M13 was conducted on 29 February and 01 March 2012.

The gauging of the monitoring well water levels was accomplished using techniques discussed in Section 2.1. Groundwater elevations are summarized in Table 2-2 for the MFG.

Groundwater monitoring was conducted in accordance with Appendix A (FSP) of the LTM Plan, as described above.

Blind duplicate samples were collected at a rate of 10% (1 per 10) for each analyte sample total. Blind duplicate M13-MW999 was collected at parent location M13-MW809 at Landfill M13 for VOCs, SVOCs, explosives, TAL metals, nitrate, and sulfate.

Matrix spike/matrix spike duplicate (MS/MSD) samples are collected at a rate of 5% (1 per 20) for each analyte sample total.

Third-party Level III data validation was completed for all groundwater and surface water samples collected. Based on the results of the validation, a data usability report was completed and is included in Appendix B1 and data validation reports are included in Appendix B2 of this report.

### **2.1.2 April 2012 Monitoring**

TolTest/MWH measured water levels or surveyed a total of 142 monitoring wells and surface water locations at JOAAP. A total of 34 monitoring wells and 1 surface water location were sampled at the MFG (M1, M6, M7, M9, other areas, Landfill M11, and Landfill M13) and 10 monitoring wells and 5 surface water locations were sampled at the LAP Area (sites L1 and L3/Landfill L3) as summarized in Table 1-1. Field activities were conducted from April 10 through 17, 2012 in accordance with Appendix A (FSP) of the LTM Plan.

The gauging of the monitoring well water levels was accomplished using techniques discussed in Section 2.1. Surface water elevations are determined by referencing to the known elevations of nearby benchmarks using a level and rod and from marks on existing structures (bridges) for some locations; where at others a direct measurement with a water level indicator was completed. All gauging and surveying measurements were taken to an accuracy of +/- 0.01 ft. All surface water locations contained water during gauging and

sampling activities. Water level measurements and surveying activities for each site were generally completed within a 24-hour period.

Monitoring well information for the MFG area monitoring wells and water levels measured in February and April 2012 are summarized in Table 2-2. Monitoring well information for the LAP area monitoring wells and water levels at monitoring wells measured in April 2012 are summarized in Table 2-3. Surface water elevations are summarized in Table 2-4. Groundwater and surface water hydraulics are discussed in Section 3 on a site by site basis.

Groundwater sampling was conducted in accordance with Appendix A (FSP) of the LTM Plan, as described above. Surface water samples were collected by directly immersing the sample container into the surface water body so as to fill the bottle if filtration was not required. If filtration was required, a peristaltic pump with tubing placed directly in the surface water body was used for sample collection.

Blind duplicate samples are collected at a rate of 10% for each analyte sample total. The majority of the duplicate samples were collected from monitoring wells that had previous analyte detections. Duplicate samples were collected from eight monitoring wells in the LAP and MFG areas in April 2012. Details concerning field duplicates for April 2012 are as follows:

| <b>Duplicate Sample Number</b> | <b>Monitoring Point Sampled</b> | <b>Site</b>       | <b>Sample Date</b> | <b>Analyte</b>   |
|--------------------------------|---------------------------------|-------------------|--------------------|--|
| MW994                          | MW652                           | M6                | 4/14/2012          | Explosives   |
| MW995                          | MW123R                          | M6                | 4/14/2012          | Explosives   |
| MW997                          | MW642                           | M1                | 4/12/2012          | Sulfate  |
| MW998                          | MW641                           | M1                | 4/12/2012          | Sulfate  |
| MW999                          | MW630                           | L3/Landfill<br>L3 | 4/11/2012          | Explosives and TAL<br>Metals                                       |
| MW999                          | MW362                           | M13               | 4/16/2012          | VOCs, SVOCs,<br>Explosives, TAL<br>Metals, Nitrate, and<br>Sulfate |

Matrix spike/matrix spike duplicate samples are collected at a rate of 5% for each analyte sample total.

Third-party Level III data validation was completed for all groundwater and surface water samples collected. Based on the results of the validation, a data usability report was completed and is included in Appendix B1. Data validation reports are included in Appendix B2 of this report.

Repair activities completed during the April 2012 sampling activities included the following:

- A new lock was added to L1 monitoring well MW173
- A new lock was added to L3 monitoring well MW3
- A weep hole was drilled in the protective casing for M1 monitoring well MW104
- A new well cap was added to MFG monitoring well MW118

Additional required repair activities identified include the following:

- The hinge requires repair on L3 well MW411
- A new lock and weep hole are required at M9 monitoring well MW121

These required repair activities will be completed during the fall 2012 sampling round.

## **2.2 LANDFILL INSPECTIONS**

Post-closure monitoring requirements for Landfills L3, L11, and M13 are mandated by Illinois Administrative Code (IAC) Title 5, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for 15 years at Landfill M13 and 30 years at Landfills L3 and M11. The LTM Plan states that the L3 Landfill cover will be inspected quarterly, the M11 Landfill cover will be inspected quarterly for the first five years and annually for 25 years, and the M13 Landfill cover will be inspected quarterly. Objectives include:

- Confirm that the landfill cap has controlled leaching so that water quality will not be threatened in the future;
- Ensure that the cap is maintained in a manner that will not increase infiltration in the future or otherwise allow waste to be exposed;
- Keep survey points protected and visible to facilitate identification in the future.
- At M13 ensure the fence and signage installed to restrict site access remain in place and serviceable; and
- At M13 certify that institutional controls remain in place.

According to IAC and the Final LTM Plan, Landfill L3, M11, and M13 covers will be inspected on a quarterly basis for:

- Depressions indicating subsidence or other deformations that could breach the cover;

- Erosion features;
- Growth of deep rooted vegetation or invasive species that would adversely affect evapotranspiration and/or erosion armoring; and
- Debris or blockage of drainage structure.

In addition, land use restrictions have been imposed across the area within the fence. Annual certification is required to document that none of the following are occurring within the fence:

- Development
- Intrusive work
- Excavation that could mobilize contaminants of concern (COCs)
- Alteration of surface water flow
- Vehicle use other than that associated with maintenance of the cover/cap.

Landfill inspections were conducted on a quarterly basis at landfills L3, M11, and M13 starting in October 2008 in accordance with the LTM Plan. Landfill inspection reports for March and April 2012 are included as Appendices A1 and A2, respectively.

### **2.2.1 March 2012 Landfill Inspections**

Site inspections of Landfills L3, M11, and M13 were conducted on March 1, 2012 in accordance with the LTM Plan. The rip rap along Prairie Creek at Site L3 has been washed away at several locations and is in need of repair. Although small areas of the synthetic cap is exposed at several locations as a result of the rip rap being washed away, the landfill appears to be stable and does not appear to be failing. The remaining rip rap also appears to be stable. The March Post-Closure Inspection Report is included in Appendix A1.

### **2.2.2 April 2012 Landfill Inspections**

Site inspections of Landfills L3, M11, and M13 were conducted on April 18, 2012 in accordance with the LTM Plan. Woody vegetation growing on Landfills L3, M11, and M13 were removed prior to the inspection. The rip rap along Prairie Creek at Site L3 has been washed away at several locations and is in need of repair. Although small areas of the synthetic cap is exposed at several locations as a result of the rip rap being washed away, the landfill appears to be stable and does not appear to be failing. The remaining rip rap also appears to be stable. The April Post-Closure Inspection Report is included in Appendix A2.

## **2.3 INSTITUTIONAL CONTROLS MONITORING**

The remedies selected for all areas of JOAAP do not allow unrestricted use of the property or underlying groundwater. Restrictions on use of groundwater are limited to the GMZs and annual certification that the restrictions are being maintained for each GMZ is required. Land use restrictions over and above those associated with groundwater use apply wherever waste or contamination has been left in place at levels that pose an unacceptable risk without some form of ICs. Some of those areas include the three landfills (L3, M11, and M13) with associated restrictions with annual certification. For all other areas with institutional controls there is a need for similar annual certification that the deed restrictions remain in place and are effective. Annual certifications are completed separate from this report. However, during groundwater monitoring and landfill inspections conducted quarterly at Landfill M13 and site-wide sampling conducted semi-annually in 2012, there were no observations of intrusive soil activities, construction, or improper use of groundwater which would affect the GOU or SOU remedies.

### 3.0 RESULTS AND RECOMMENDATIONS

Groundwater management zones are three-dimensional areas containing groundwater being managed to mitigate impairment according to IAC. The GMZs comprise both the glacial drift and shallow bedrock (Silurian Dolomite) aquifer and are bounded at depth by a confining shale unit (Maquoketa Shale). The GMZs were established with acceptance of the ROD. Any future modification of GMZ boundaries will have to be mutually agreed upon between the Army, USEPA, and IEPA. Groundwater monitoring wells and surface water collection points located inside and/or near the borders provide monitoring points for contaminant plumes. Site-specific plans for GMZs for GOU sites are discussed in Sections 3.1 through 3.6.

Groundwater and surface water samples collected in February and April 2012 were analyzed for one or more of the following parameters: explosive compounds, TAL metals, indicator parameters (nitrate and sulfate), VOCs, and SVOCs. Analytical results from spring 2012 sampling events for explosive compounds, TAL metals, indicator parameters (nitrate and sulfate), VOCs, and SVOCs are summarized in Tables 3-1 through 3-5, respectively. This section provides a site-specific presentation of the water level measurements and groundwater and surface water quality sampling results. The discussions are arranged by the GMZs into which each of the sites is grouped. This provides an ability to discuss the contaminant detections in relation to each of the GMZ boundaries.

Each site in Section 3 is organized into the following subsections:

General Site Introduction: General site-specific background information is presented along with any information on site monitoring wells and surface water sampling locations and water elevation measurements.

Groundwater Hydraulics: Site or GMZ figures are presented for the water table and potentiometric surface (generally in the bedrock). For groundwater hydraulic purposes, monitoring wells are designated as overburden wells (OVB), combined overburden/bedrock wells (COMBO), or bedrock wells (BRK). This designation indicates in which aquifer(s) the well is screened. When practical, discussions include the relationship between groundwater flow direction, hydraulic gradients, and contaminant migration.

Analytical Results: Figures are presented for contaminant detections observed during the February (Landfill M13) and April 2012 sampling rounds. For groundwater quality discussions, monitoring wells and surface water sampling points are designated as in-plume, early warning, or compliance points and at Landfill sites as upgradient or downgradient. These designations are included in the LTM Plan and are based on the location of the sampling point relative to historic groundwater detections, site GMZ, and/or site features.

Analytical data from 2012 sampling are included in the discussion of analytical results. Contaminant concentrations that are greater than site RGs are included in the discussion even if there is not a notable change in the analytical data for that constituent.

Most Sample Quantitation Limits (SQLs) are less than site RGs; SQLs are provided for each compound in the Data Validation Report (DVR) presented in Appendix B2. In the discussion of analytical results, 'not detected' (ND) implies that the contaminant concentration is less than site RGs. Analytical data are reported to the SQL. If there were detections between the method detection limit (MDL) and the SQL, the quantity would be flagged "J" as estimated concentration (J). The MDLs are less than the RGs.

*Recommendations:* Recommendations for each site are presented specific to the conditions of the LTM Plan. A summary of recommendations is presented in Section 4. Since there is little evaluation of trends included in the semi-annual reports, the recommendations included herein are general in nature.

### **3.1 SITE L1**

Site L1 is one of six GMZs created to manage risk arising from groundwater contamination and to monitor performance of the selected remedy. Site L1 comprises 80 acres on which munitions production facilities were constructed in 1941. It is centrally located in the northern portion of the LAP Area as can be seen on Figure 1-2. Historically, Site L1 was used for demilitarization and reclamation of various munitions starting with crystallization of ammonium nitrate, but then was converted for shell renovation and 1,3,5-trinitrobenzene (TNB) recovery up until 1945. By April of 1946, it had been reactivated to reclaim TNT.

In the TNT operation, hot water was used to wash the TNT out of shells. The water was discharged to a sump where solid explosives were removed for burning and the overflow (pink water) was routed to a 4.3-acre ridge and furrow evaporation/percolation pond. By 1952, two additional evaporation ponds had been constructed southeast of the ridge and furrow unit on either side of a drainage ditch flowing from it to Prairie Creek. Prairie Creek, the surface water body draining the area, is incised into the bedrock and appears to transmit groundwater that discharges directly or emerges into the streambed by virtue of the head relief available in the open channel.

Explosive residues in soil were observed in the ridge and furrow impoundment, the western most of the two newer ponds, the area south of the washout building, and the soil around the sump. The underlying groundwater contains TNT, TNB, 2,6-dinitrotoluene (2,6-DNT), and royal demolition explosive (RDX) both in the alluvium and in the shallow weathered bedrock, as well as degradation products from those parent compounds, as a result of the infiltration of pink water and possibly continued leaching of explosives in soil. The footprint of remedial goal (RG) exceedances currently extends to the southeast of the source area (in the proximity of MW131) to monitoring well MW173. Soil source control measures at the ridge and furrow pond were conducted in 2005 to 2006. The

contamination is now a legacy groundwater plume continuing to migrate to the southeast towards Prairie Creek, where it is believed to largely discharge into the creek through upwelling. Given these observations, the contaminant footprint is expected to separate from the source area over time and migrate in the alluvium and shallow bedrock until it discharges to Prairie Creek.

The overburden aquifer generally consists of a complex stratification of clay and silt, with some silty gravel observed in the eastern portion of the site near MW174. Overburden generally thins from approximately 20 ft in the north to less than 5 ft in the south and from approximately 15 ft in the east to 5 ft in the west.

### **3.1.1 Groundwater Hydraulics**

The groundwater monitoring network at Site L1 consists of 16 wells: 8 overburden wells, 1 combined overburden/bedrock well, and 7 bedrock wells. Water levels are measured at the groundwater/surface water locations that are sampled (listed below), and at monitoring wells MW171, MW175, MW176, MW177, MW178, MW400, MW610, MW611 and WES2. Monitoring well information and water levels for April are summarized in Table 2-3. The groundwater flow direction in the overburden aquifer is generally toward the southeast as shown on Figure 3-1.

The horizontal gradient in the northern part of Site L1 was calculated to be 0.0118 feet per foot (ft/ft) and in the southern part of Site L1 was calculated to be 0.0126 ft/ft in April (Table 3-6). Using the reported average of  $9.2\text{E-}06$  centimeters per second (cm/sec) for hydraulic conductivity and an assumed porosity of 0.30, the calculated flow velocity in the overburden at Site L1 was approximately 0.0011 feet per day (ft/day) or 0.402 feet per year (ft/yr) in April (Table 3-7). As stated in the LTM Plan, a value of 16 ft/yr will be used to evaluate data from groundwater early warning sample points, which will accommodate heterogeneities present in the overburden aquifer.

Bedrock wells are installed at shallow depths (<10 ft below top of bedrock). The groundwater flow direction in the bedrock aquifer is generally toward the southeast as shown on Figure 3-2. Prairie Creek, the surface water body draining the area, is incised into the bedrock in the southern and central parts of the site and appears to transmit groundwater that discharges directly or upwells into the streambed by virtue of the head relief available in the open channel. There is no evidence that contamination flows beneath Prairie Creek as it has not appeared in monitoring wells to the west. The groundwater elevation at monitoring well MW611 was greater than the elevation of Prairie Creek, indicating a gaining stream scenario. Vertical gradients observed were upward at well nests MW171/MW177, MW172/MW173, and MW401/MW610 and downward at well nest MW178/MW176 in April (Table 3-8).

The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically. Based on groundwater flow data, Prairie Creek is the likely discharge point for shallow groundwater in the vicinity of Site L1.

### 3.1.2 Analytical Results

Groundwater and surface water sampling points for Site L1 during spring 2012 are summarized in Table 1-1. The following monitoring wells and the surface water sampling location at L1 are sampled for explosives:

- In-Plume – MW131, MW173, and WES1
- Early Warning – MW174 and WES3
- Compliance –surface water sampling point SW550 for the overburden aquifer

Groundwater and surface water samples collected at Site L1 in April 2012 were analyzed for explosive compounds in accordance with Appendix B (QAPP) of the LTM Plan. Explosive compound detections for April 2012 sampling conducted at Site L1 are summarized in Table 3-1 and on Figure 3-3. A brief discussion of analytical results by well type follows.

***In-Plume Wells (MW131, MW173, and WES1):*** At overburden monitoring well MW131, 1,3,5-TNT exceeded the RG at a concentration of 2,200 micrograms per liter ( $\mu\text{g/L}$ ) for the April sampling event.

At overburden monitoring well MW173, RDX exceeded the RG at a concentration of 10  $\mu\text{g/L}$  and TNT exceeded the RG at a concentration of 12  $\mu\text{g/L}$  for the April sampling event.

At bedrock monitoring well WES1, TNB exceeded the RG at a concentration of 40  $\mu\text{g/L}$  and TNT exceeded the RG at a concentration of 38  $\mu\text{g/L}$  for the April sampling event.

The continued detection of degradation products 2-amino-4,6-dinitrotoluene (2-A-4,6-DNT) and 4-amino-2,6-dinitrotoluene (4-A-2,6-DNT) in samples collected from in-plume monitoring wells indicate contaminant reduction is occurring.

***Early Warning Wells (MW174 and WES3):*** At overburden monitoring well MW174 and bedrock well WES3, there were no RG exceedances of explosive compounds for the April sampling event.

***Compliance Point (SW550):*** At surface water sampling point SW550, there were no detections of explosive compounds for the April sampling event.

### 3.1.3 Recommendations

There are no changes in the monitoring program or network recommended. Sampling at Site L1 should be performed during the Fall 2012 sampling event as outlined in Table 3-9.

### 3.2 SITE L3/LANDFILL L3

Site L3 is the third of six GMZs created to manage risk arising from groundwater contamination and to monitor performance of the selected remedy. Site L3 comprises approximately 50 acres used as a demolition area directly southwest of Site L2 (Figure 1-2). Landfill L3 (described below) occupies 3.32 acres of the Site L3 area (Figure 3-4). Site L3 is bounded on the west by Prairie Creek, the south by an unnamed tributary of Prairie Creek, and the east by Star Grove Cemetery. Predominant use of the area was for open burning of combustibles and munitions crates, including some materials with low level explosive contamination. An air curtain destructor was constructed at the site to reduce emissions, but was never put into use. There was also a one-acre fire training area at the site, a small depression surrounded by an earthen berm.

Specific burning units included “U” and “L” shaped burn pads and a burn cage on a concrete slab. Geophysical surveys noted a number of metallic anomalies buried around the burn pads. The soil was also found to contain lead and RDX contamination at levels requiring remediation. Berms along Prairie Creek were found to contain lead, chlordane, 2,6-DNT, and phosphate above their respective RGs. It has been posited that the contamination in these berms arises from filling activity in the area when the berms were constructed. Unexploded ordnance may also be present in this area. The remedy selected for the area along Prairie Creek was consolidation and capping into what is now called Landfill L3.

Landfill L3 is located along the western edge of the Site L3 GMZ on the east bank of Prairie Creek, as illustrated on Figure 3-4. The area of Landfill L3 was originally contaminated through import of contaminated fill. However, other waste and contaminated soil have been moved to the Site L3 Landfill as a part of the L3 RA in order to consolidate residual contamination into a smaller footprint. Implementation of the remedy began in 2007 and was completed in 2008.

Landfill L3 is believed to contain metals and explosive residues that could continue to contaminate the underlying groundwater and migrate to Prairie Creek. Because the landfill is bordered by Prairie Creek, any contamination that infiltrates from the filled area would be expected to migrate to Prairie Creek and quickly be discharged as the groundwater flows upward into the surface water body.

Monitoring at Landfill L3 is mandated by IAC Title 5, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for a period of 30 years. Objectives include:

- Confirm that the landfill cap has controlled leaching so that water quality will not be threatened in the future;
- Ensure that the cap is maintained in a manner that will not increase infiltration in the future or otherwise allow waste to be exposed; and

- Keep survey points protected and visible to facilitate identification in the future.

Samples from overburden well MW410 are obtained from a silt layer. Samples from combination well MW630 and bedrock well MW412 are obtained at shallow depths (<10 ft below top of bedrock), while samples from bedrock wells MW631 and MW633 are obtained from intermediate depths (10 to 20 ft below top of bedrock).

### 3.2.1 Groundwater Hydraulics

The groundwater monitoring network at Site L3/Landfill L3 consists of 11 wells: 4 overburden wells, 2 combined overburden/bedrock wells, and 5 bedrock wells. Water levels are measured at the groundwater/surface water locations that are sampled (listed below), and at monitoring wells MW136, MW137, and MW411. Additionally, the water level was measured in April at Site L2 (which was not sampled in April) monitoring well MW134 to provide horizontal groundwater level control. Monitoring well information and water levels for April are summarized in Table 2-3. Surface water elevation in the northern portion of the site is dictated by the dam located on Prairie Creek just north of Central Road (Figure 3-4). The groundwater flow direction in the overburden aquifer is generally toward the west/southwest as shown on Figure 3-4.

The horizontal gradient in the overburden aquifer at Site L3 was calculated to be 0.0276 ft/ft in April (Table 3-6). Using an average hydraulic conductivity value of 1.6E-03 cm/sec and an assumed porosity of 0.3, the flow velocity in the overburden aquifer at Site L3 was approximately 0.4172 ft/day or 152 ft/yr in April (Table 3-7). There are no wells directly downgradient of MW410 or MW412 from which apparent travel times could be estimated. RDX has been observed in Prairie Creek, indicating it has migrated the intervening distance over the last 50 to 60 years but, because the contamination appears to arise from fill activity in the area, the presence of RDX in Prairie Creek water may represent contamination that started much closer to the stream bank than either of the in-plume monitoring wells. Empirical data at Sites L1 and L2 have suggested transport rates more on the order of 2.5 to 11 ft/yr, but hydraulic conductivity may be higher in the disturbed soil of Site L3 and higher gradients found proximate to the discharge line along Prairie Creek. Accordingly, the larger of the two velocities, 11 ft/yr, is assumed for Site L3.

The groundwater flow direction in the bedrock aquifer is generally toward the west as shown on Figure 3-5. Prairie Creek, the surface water body draining the area, is incised into the bedrock in the southern and central parts of the site and appears to transmit groundwater that discharges directly or upwells into the streambed by virtue of the head relief available in the open channel. There is no evidence that contamination flows beneath Prairie Creek as it has not appeared in monitoring wells to the west. The groundwater elevation at monitoring well MW632 was greater than the elevation of Prairie Creek, indicating a gaining stream scenario. An upward vertical gradient was observed at well nest MW630/MW631 at Site L3 in April (Table 3-8), further supporting a gaining stream scenario.

The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically. Based on groundwater flow data, Prairie Creek is the likely discharge point for all shallow groundwater in the vicinity of Site L3/Landfill L3.

### 3.2.2 Analytical Results

Groundwater and surface water sampling points for Site L3/Landfill L3 during April 2012 are summarized in Table 1-1. The following monitoring wells and surface water sampling points at L3 are sampled for explosives and TAL metals:

- Upgradient – surface water sampling point SW004, where the creek first touches the GMZ boundary and upstream of the storm water outfall
- In-Plume/Downgradient – MW410 and MW412
- Early Warning/Downgradient – MW630, MW631, and MW633
- Compliance/Downgradient – surface water sampling point SW777 for the overburden aquifer, where the creek leaves the GMZ boundary
- Downgradient - Surface water sampling points SW557, upstream of the landfill drainage swale discharge, and SW558, at the constructed drainage swale along the southwest side of the landfill

Groundwater and surface water samples collected at Site L3/Landfill L3 in April were analyzed for explosive compounds and TAL metals in accordance with Appendix B (QAPP) of the LTM Plan. Explosive compounds detected during April 2012 sampling conducted at Site L3 are summarized in Table 3-1 and illustrated on Figure 3-6. Metals detected during April sampling conducted at L3/Landfill L3 are summarized in Table 3-2. For Landfill L3, the monitoring well locations are classified as upgradient or downgradient locations. Therefore, the same well can represent two separate classifications at Site L3/Landfill L3. A brief discussion of analytical results by well type follows:

***Upgradient Point (SW004):*** At surface water sampling point SW004, there were no detections of explosive compounds or metals RG exceedances for the April sampling event.

***In-Plume Wells (MW410 and MW412 {downgradient}):*** At overburden monitoring well MW410, there were no explosive compound detections or metals RG exceedances for the April sampling event.

At bedrock monitoring well MW412, RDX continued to exceed the RG at a concentration of 120 µg/L for the April sampling event. There were no metals RG exceedances for the April sampling event. The continued detection of degradation products 2-A-4,6-DNT and 4-A-2,6-DNT in samples collected from monitoring well MW412 indicate contaminant reduction is occurring.

***Early Warning (downgradient) Wells (MW630, MW631, and MW633):*** At bedrock monitoring well MW630, there was a RG exceedance for RDX at a concentration of 8.7 ug/L for the April sampling event. There were no metals RG exceedances for the April sampling event.

At bedrock monitoring well MW631, there were no explosive compound detections or metals RG exceedances for the April sampling event.

At bedrock monitoring well MW633, RDX continued to exceed the RG at a concentration of 6.7 ug/L for the April sampling event. There were no metals RG exceedances for the April sampling event.

***Compliance (downgradient) Points (SW777):*** At surface water sampling point SW777, RDX was detected below the RG at a concentration of 0.25 ug/L for the April sampling event. There were no metals RG exceedances for the April sampling event.

***Additional Downgradient Points (SW557 and SW558):*** At surface water sampling point SW557, HMX and RDX were detected below the RG at concentrations of 1.1 ug/L and 3.2 ug/L for the April sampling event, respectively. There were no metals RG exceedances for the April sampling event.

At surface water sampling point SW558, there were no explosive compound detections or metals RG exceedances for the April sampling event.

### **3.2.3 Recommendations**

There are no changes in the monitoring program or network recommended. Sampling at Site L3/Landfill L3 should be performed during the Fall 2012 sampling event as outlined in Table 3-9.

## **3.3 SITE M1**

Site M1, the southern ash pile, is part of the MFG facility (Figure 1-2), but contains unique contaminants not present at actionable levels at any other GMZ. As such, it is singled out as the fifth of the six GMZs. Site M1 comprises 68 acres in the southwestern part of the MFG facility, where from 1965 to 1974, ash residues from the incineration of “red water” (TNT production waste water) were landfilled and placed on unlined soil. At various times (1985, 1993, and 1996) after closure, polyvinyl chloride (PVC) and clay were used to repair erosion damage to the cover.

Groundwater beneath and downgradient of the pile was observed to contain elevated levels of sulfate, 2,6-DNT, and antimony. The latter two compounds exceeded their respective RG on a single sample event only, but the sulfate has exceeded its RG continuously in groundwater and occasionally in surface water. In February 2003, the United States Army

Corps of Engineers (USACE) submitted *Explanation of Significance Difference Site M1 – Southern Ash Pile* (USACE, 2003), which expanded the northern boundary of the GMZ for Site M1 to encompass concentrations of sulfate in excess of the RG that had migrated beyond the original boundary.

The elevated sulfate is believed to originate in leachate from the Site M1 ash pile that infiltrated through the soil and entered the shallow groundwater. Dissolved sulfate then migrated to the northwest. Sulfate-containing groundwater flows into Prairie Creek, which is located northwest of the former ash pile. Concentrations of sulfate have been measured as high as 46,000 milligrams per liter (mg/L), or over 100 times the RG of 400 mg/L. As recently as 2000, surface water samples were collected that exceeded the RG of 500 mg/L. The ash piles were removed in 2006-2007 eliminating the primary source of sulfate. Consequently, dissolved sulfate in groundwater is now a legacy plume migrating to the northwest.

The overburden aquifer primarily consists of silt and clay, with scarce amounts of sand and silty gravel at the bedrock contact. Sand is abundant in the higher, unsaturated, parts of the site. Over most of Site M1, the overburden thickness is fairly consistent between 15 and 20 ft thick. At the northern end of the site, near MW642/MW641, the overburden consists entirely of silty gravel and the depth to bedrock is greater than 40 ft. The presence of Prairie Creek in the western part of M1 suggests that Prairie Creek is the discharge point for shallow groundwater.

### **3.3.1 Groundwater Hydraulics**

The groundwater monitoring network within this site consists of 18 wells: 10 overburden wells, 4 combined overburden/bedrock wells, and 4 bedrock wells. Water levels are measured at the groundwater/surface water locations that are sampled (listed below), and at monitoring wells MW104, MW105, MW106, MW201, MW347, MW351, and MW647. Monitoring well information and water levels for October are summarized in Table 2-2. The groundwater flow direction in the overburden aquifer is generally to the northwest, as shown on Figure 3-7.

The horizontal gradient at Site M1 was 0.0303 ft/ft in April (Table 3-6). Using an average hydraulic conductivity value of  $6.6\text{E-}05$  cm/sec and an assumed porosity of 0.3, the flow velocity in the overburden aquifer at Site M1 was approximately 0.0189 ft/day or 6.9 ft/yr in April (Table 3-7). However, that would indicate that the plume should be on the order of 80 ft from the ash pile after 40 years of travel time (1965 to 2005). In fact, by 2005, the elevated sulfate levels were observed out to MW645, a distance of 2,060 ft, which suggests a flow velocity of approximately 50 ft/yr.

The groundwater flow direction in the bedrock aquifer is generally toward the northwest, as shown on Figure 3-8. An upward vertical gradient was observed at well nest MW351/MW640 and a downward vertical gradient was observed at well nest MW641/MW642 in April (Table 3-8).

The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically. Based on groundwater flow data, Prairie Creek is the likely discharge point for all shallow groundwater in the vicinity of Site M1.

### 3.3.2 Analytical Results

Groundwater sampling points for Site M1 during spring 2012 are summarized in Table 1-1. The following monitoring wells and the surface water sampling point at M1 are sampled for sulfate:

- In-Plume – MW107, MW231, MW640, MW641, and MW642
- Early Warning – MW643 and MW644
- Compliance – MW646 for the bedrock aquifer and MW645, MW648, and MW649 and surface water sampling point SW709 where the creek leaves the GMZ boundary for the overburden aquifer

Groundwater and surface water samples collected at Site M1 in April were analyzed for sulfate in accordance with Appendix B (QAPP) of the LTM Plan. Sulfate detections for the April sampling event conducted at Site M1 are summarized in Table 3-3 and shown on Figure 3-9. A brief discussion of analytical results by well type follows:

***In-Plume Wells (MW107, MW231, MW640, MW641, and MW642):*** At monitoring well MW107, sulfate exceeded the RG at a concentration of 26,000 mg/L for the April sampling event.

At monitoring well MW231, sulfate exceeded the RG at a concentration of 35,000 mg/L for the April sampling event.

At monitoring well MW640, sulfate exceeded the RG at a concentration of 5,200 mg/L for the April sampling event.

At monitoring well MW641, sulfate exceeded the RG at a concentration of 640 mg/L for the April sampling event.

At monitoring well MW642, sulfate exceeded the RG at a concentration of 420 mg/L for the April sampling event.

***Early Warning Wells (MW643 and MW644):*** At monitoring wells MW643 and MW644, sulfate was detected at concentrations below the RG for the April sampling event.

***Compliance Points (MW645, MW646, MW648, MW649, and SW709):*** At monitoring wells MW645, MW646, MW648, and MW649 and surface water sampling point SW709, sulfate was detected at concentrations below the RG for the April sampling event.

### **3.3.3 Recommendations**

There are no changes in the monitoring program or network recommended. Sampling at Site M1 should be performed during the Fall 2012 sampling event as outlined in Table 3-9.

## **3.4 MFG GMZ**

The MFG Area is the sixth GMZ, lies in the northwestern part of JOAAP, and was created by the consolidation of several discrete sites including M3, M4, M5, M6, M7, M8, M9, M13, and outlying wells deemed as “Other Areas”. The MFG Area GMZ is illustrated on Figure 1-2. Each of these areas hosted unique operations that led to the release of different contaminants. Groundwater contamination consisting of explosive compounds, excluding contamination from Landfill M13, is being managed collectively and is included as Section 3.6. Of the areas, only Sites M6, M9, and M13 continue to have groundwater contamination with COCs in excess of RGs. Each site comprising the MFG GMZ will be independently closed before the MFG GMZ can be eliminated.

Monitoring wells from Sites M6, M7, M9, and Other Areas continue to be included in the MFG groundwater sampling. Numerous monitoring wells are also measured as water level control points at these other sites.

### **3.4.1 Site M6**

Site M6, the TNT Ditch Complex, covers 271 acres to the northwest of Site M5 in the central part of the MFG Area (Figure 1-2) and was largely used for TNT and DNT production during World War II, and then again in the Korean and Vietnam Wars. In between the wars, the facilities were used for research and development of different explosives like nitroxylenes. Production of TNT was terminated in 1977.

Production of TNT was conducted in 12 parallel lines, each containing a full sequence of production steps from the “mono-house” to the “bi-house” and then the “tri-house” buildings. Waste water (“red water”) from each “tri-house” and the wash houses was discharged from wooden tanks to clay-lined ditches feeding into the TNT Ditch. In 1965, the original drainage system was replaced by wooden flumes completed in the TNT Ditch and the red water was diverted to Site M7 for treatment. Dinitrotoluene production waste water was discharged from wooden tanks into open troughs and ditches that flowed to the storm water sewer system and the TNT Ditch, ultimately flowing untreated into Grant Creek. In addition to normal processing water, the TNT Ditch received drench water used to kill a production run when reactions ran out of control and posed an explosive threat. Between 1972 and 1974, there were more than 30 recorded instances of drenching with the associated discharge of “bi-oil” and concentrated nitric and sulfuric acid.

The full range of nitroaromatic compounds have been found in soil at Site M7, with concentrations of TNT, 2,4-dinitrotoluene (2,4-DNT), lead, arsenic, and beryllium

exceeding their respective RGs. Seven explosive compounds have been observed in the underlying groundwater at concentrations that exceed their respective RGs: TNT, 2,4-DNT, 2,6-DNT, 2-nitrotoluene (2-NT), TNB, nitrobenzene (NB), and RDX.

The overburden aquifer primarily consists of silt and clay, with variable amounts of sand and silty gravel. The overburden thickness ranges from 5 to 30 ft across the site. Based on available information, screens for overburden wells at Site M6 are set in silt and/or clay layers with the exception of monitoring wells MW650 and MW652; which have screens set in a silty gravel layer.

#### **3.4.1.1 Groundwater Hydraulics**

The groundwater monitoring network within Site M6 consists of 39 wells: 14 overburden wells, 2 combined overburden/bedrock wells, and 23 bedrock wells. Water levels are measured at the groundwater locations that are sampled (listed below), and at numerous monitoring wells at M6 and sites including M3, M4, M5, M8, M9, and "Other Areas". Monitoring well information and water levels for October are summarized in Table 2-2. The groundwater flow direction in the overburden aquifer is generally toward the west as shown on Figure 3-10.

The horizontal gradient in the northern part of Site M6 was calculated to be 0.0187 ft/ft and in the southern part of Site M6 was calculated to be 0.0225 ft/ft in April (Table 3-6). Using an average hydraulic conductivity value of  $8.6\text{E-}04$  cm/sec and an assumed porosity of 0.30, the flow velocity at Site M6 was approximately 0.1674 ft/day or 61.1 ft/yr in April (Table 3-7). However, at Site M6, COCs have not been detected at wells 600 ft directly downgradient (MW212R to MW123R and MW162R). Given the 60 years that have passed since releases began at Site M6, this suggests the transport time for RDX and TNT is less than  $600/60 = 10$  ft/yr. A rate of 10 ft/yr is comparable to transport rates calculated for other areas of JOAAP.

The groundwater flow direction in the bedrock aquifer is generally toward the west as shown on Figure 3-11. Screens for bedrock monitoring wells MW123, MW314, MW316, MW318, and MW654 are set at shallow depths (<10 ft below top of bedrock), while screens for monitoring wells MW118, MW119, MW213R, MW215R, MW310R, MW311, MW313, and MW653 are set at intermediate depths within the bedrock aquifer (10 to 20 ft below top of bedrock). Screens for monitoring wells MW312, MW315, MW317, MW320, MW651, and MW655 are set deeper within the bedrock aquifer (>20 ft below top of bedrock). Vertical gradients were generally downward for well nests located along the escarpment, where the former TNT load lines were oriented at Site M6, and were upward in the wetland immediately to the west in April (Table 3-8).

The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically.

### 3.4.1.2 Analytical Results

Groundwater sampling points for Site M6 during April 2012 are summarized in Table 1-1. The following monitoring wells at M6 and other sites included in the M6 grouping are sampled for explosives:

- In-Plume – MW212R, MW652, and MW330 (M9)
- Early Warning – MW123R, MW162R, MW313, MW318, MW319, and MW654
- Compliance – MW117 and MW118 and MW119 (Other Areas).

Groundwater samples collected at Site M6 in April were analyzed for explosive compounds in accordance with Appendix B (QAPP) of the LTM Plan. Monitoring well MW330 was sampled for sulfate. Explosive compound detections for the April sampling event conducted at Site M6 are summarized in Table 3-1 and shown on Figure 3-12. Sulfate detections the April sampling event conducted at Site M6 are summarized in Table 3-3. A brief discussion of analytical results by well type follows:

***In-Plume Wells (MW212R, MW652, and MW330):*** At monitoring well MW212R, 2,4-DNT (620 µg/L), 2,6-DNT (260 µg/L), and TNT (39 µg/L) exceeded the RG for the April sampling event.

At monitoring well MW652, 2,4-DNT (8,400 µg/L), 2,6-DNT (3,300 µg/L), 2-NT (44,000µg/L), and TNT (1,600 µg/L) exceeded the RG for the April sampling event.

At monitoring well MW330, sulfate exceeded the RG at a concentration of 430 µg/L for the April sampling event.

***Early Warning Wells (MW123R, MW162R, MW313, MW318, MW319, and MW654):*** At monitoring wells MW123R, MW162R, and MW313, there were no RG exceedances of explosive compounds for the April sampling event.

At monitoring well MW318, 2,6-DNT exceeded the RG at a concentration of 0.45 ug/L for the April sampling event.

At monitoring well MW319, there were no RG exceedances of explosive compounds for the April sampling event.

At monitoring well MW654, 2,4-DNT exceeded the RG at a concentration of 1.7 ug/L and 2,6-DNT exceeded the RG at a concentration of 0.97 ug/L for the April sampling event. The continued detection of degradation products 2-A-4,6-DNT and 4-A-2,6-DNT in samples collected from monitoring well MW654 indicate contaminant reduction is occurring.

**Compliance Wells (MW117 and MW118 and MW119:** At monitoring wells MW117, MW118, and MW119, there were no detections of explosive compounds for the April sampling event.

#### **3.4.1.3 Recommendations**

There are no changes in the monitoring program or network recommended. Sampling at Site M6 should be performed during the Fall 2012 sampling event as outlined in Table 3-9.

#### **3.4.2 Site M7**

Site M7, the Red Water Area, comprises 49 acres in the central part of the MFG Area between Site M6 and Site M7 on the west bank of the TNT Ditch (Figure 1-2). Facilities at Site M7 included storage tanks, pump stations, evaporators, and incinerators used to destroy the red water from Site M6 after construction in 1965. Overflows of untreated red water were stored in the Red Water Lagoon, a 3.3 acre impoundment that was remediated in 1985.

Contaminants of concern in soil included TNT, 2,4- and 2,6-DNT, TNB, and RDX. Source areas in soil included the drainage areas in the northwest part of Site M7. Soil RA activities were completed in 2001 at Site M7. Contaminants of concern in groundwater include: TNT, 2,4-DNT, 2,6-DNT, and RDX.

The overburden aquifer primarily consists of silt and clay, with some sand and gravel in the upper, unsaturated, part of the aquifer. The overburden thickness ranges from less than 5 to more than 10 ft across Site M7. Based on available information, samples from overburden wells are obtained from discontinuous sand and gravel layers.

##### **3.4.2.1 Groundwater Hydraulics**

The groundwater monitoring network at Site M7 consists of 9 wells: 4 overburden wells, 1 combined overburden/bedrock well, and 4 bedrock wells. Water levels are measured at each groundwater location that is sampled (listed below), and at monitoring wells MW156, MW159, MW216, MW217, MW321, MW322, MW660, and MW661. Monitoring well information and water levels for October are summarized in Table 2-2. The groundwater flow direction in the overburden aquifer in the immediate vicinity of Site M7 is generally toward the west/southwest as shown on Figure 3-10.

The horizontal gradient at Site M7 was calculated to be 0.0105 ft/ft in April (Table 3-6). Using an average hydraulic conductivity value of 6.7E-04 cm/sec and an assumed porosity of 0.30, the flow velocity at Site M7 was approximately 0.0665 ft/day or 24 ft/yr in April (Table 3-7).

The groundwater flow direction in the bedrock aquifer in the immediate vicinity of Site M7 is generally toward the west/northwest as shown on Figure 3-11. With the exception of well MW124R, bedrock wells are screened at intermediate depths within the bedrock aquifer (10 to 20 ft below top of bedrock). Bedrock well MW124R and combination well MW157 are screened at a shallow depth within bedrock (<10 ft below top of bedrock). Vertical gradients were calculated for well nests MW216/MW217, MW660/MW661, MW321/MW322, and MW157/MW158 located in the vicinity of Site M7. Calculated vertical gradients were downward at well nests MW321/MW322 and MW660/MW661, upward at well nest MW216/MW217 (located slightly north), and a very low vertical gradient was observed at well nest MW157/MW158 (located in the wetland west of the escarpment) (Table 3-8).

The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically.

#### **3.4.2.2 Analytical Results**

Monitoring well MW124R was sampled during April as an early warning bedrock well as part of the MFG monitoring network (Table 1-1).

The groundwater samples collected at Site M7 in 2012 were analyzed for explosive compounds in accordance with Appendix B (QAPP) of the LTM Plan. Explosive compound detections for the April sampling event conducted at Site M7 are summarized in Table 3-1 and shown on Figure 3-12. A brief discussion of analytical results by well type follows.

**Early Warning Well (MW124R):** At well MW124R, there were no detections of explosive compounds for the April sampling event.

#### **3.4.2.3 Recommendations**

There are no changes in the monitoring program or network recommended. Sampling at Site M7 should be performed during the Fall 2012 sampling event as outlined in Table 3-9.

### **3.5 LANDFILL M11**

Landfill M11 is located in the southwestern part of the manufacturing side of JOAAP as illustrated on Figures 1-2. The landfill monitoring area comprises approximately 133 acres. Site M11 was divided into two sections by School House Road and bordered on the west by West Patrol Road. M11 north encompassed approximately 10.5 acres of former gravel pits that were mined and filled with waste. M11 south, a former gravel pit, encompassed approximately 5.6 acres that was also mined and filled with waste. The remedy chosen for M11 was waste consolidation and capping. Implementation of the remedy began in 2006 and was completed in 2008.

The current conceptual site model (CSM) is that M11 is believed to contain manganese and sulfate containing waste that could potentially contaminate underlying groundwater and migrate beyond the GMZ.

With the implementation of the RA at Site M11, it is anticipated that the landfill cap will prevent percolation of precipitation through waste consolidated in the landfill, thus preventing groundwater contamination.

Monitoring at Landfill M11 is mandated by IAC Title 5, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for a period of 30 years. Long-term monitoring of the landfill cap will include quarterly inspections of the cap, vegetation, and drainage structures for the first five years, then annually for 25 years. Objectives include:

- Confirm that the cap has controlled leaching at the landfill so that water quality will not be threatened in the future;
- Ensure that the cap is maintained in a manner that will not increase infiltration in the future or otherwise allow waste to be exposed;
- Keep survey points protected and visible to facilitate identification in the future;

### **3.5.1 Groundwater Hydraulics**

The groundwater monitoring well network at Landfill M11 consists of 13 wells: 3 combination overburden/bedrock wells and 10 bedrock wells. Water levels are measured at the groundwater locations that are sampled (listed below), and at monitoring wells MW108, MW337, MW338, MW339, and MW340. Monitoring well information and water levels for April are summarized in Table 2-2. The groundwater flow direction in the overburden aquifer is generally toward the west as shown on Figure 3-13.

The horizontal gradient at Landfill M11 was 0.0052 ft/ft in April (Table 3-6). Using a hydraulic conductivity of 6.7E-04 cm/sec from nearby Site M7 and an assumed porosity of 0.30, the calculated flow velocity at Landfill M11 was approximately 0.0329 ft/day or 12 ft/yr in April (Table 3-7).

Bedrock is shallow at Landfill M11, ranging from 2.5 to 9 ft below ground surface. The groundwater flow direction in the bedrock aquifer is generally toward the northwest as shown on Figure 3-14. The calculated vertical gradients were upward at upgradient well nest MW802/MW803 and downward at downgradient well nest MW804/MW805 in April (Table 3-8).

The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically.

### 3.5.2 Analytical Results

Groundwater sampling points for Landfill M11 during spring 2012 are summarized in Table 1-1. The following monitoring wells at Landfill M11 are sampled for VOCs, SVOCs, TAL metals, explosives, nitrate, and sulfate:

- Upgradient – MW802
- Downgradient – MW335, MW336, and MW805

Groundwater samples collected at Landfill M11 in April and were analyzed for explosive compounds, TAL metals, indicator parameters (sulfate and nitrate), VOCs, and SVOCs in accordance with Appendix B (QAPP) of the LTM Plan. Detections for explosive compounds, TAL metals, indicator parameters (sulfate and nitrate), VOCs, and SVOCs for the sampling events conducted at Site M11 in April are summarized in Tables 3-1, 3-2, 3-3, 3-4, and 3-5, respectively. Explosive compound detections are shown on Figure 3-15. Site M11 monitoring well locations are classified as upgradient or downgradient locations. A brief discussion of analytical results by well type follows:

***Upgradient (MW802):*** There were no detections for explosive compounds for the April sampling event.

There were no RG exceedances for metals for the April sampling event.

There were no RG exceedances for nitrate or sulfate for the April sampling event.

There were no detections of VOCs for the April sampling event.

There were no detections of SVOCs for the April sampling event.

***Downgradient (MW335, MW336, and MW805):*** There were no RG exceedances for explosive compounds for the April sampling event.

There were no RG exceedances for metals for the April sampling event.

There were no RG exceedances for nitrate for the April sampling event. There were RG exceedances for sulfate in the samples collected from monitoring wells MW335 (660 mg/L), MW336 (410 mg/L), and MW805 (470 mg/L) for the April sampling event.

There were no detections of VOCs for the April sampling event.

There were no detections of SVOCs for the April sampling event.

### **3.5.3 Recommendations**

There are no changes in the monitoring program or network recommended. Sampling at Landfill M11 should be performed during the Fall 2012 sampling event as outlined in Table 3-9.

## **3.6 LANDFILL M13**

Landfill M13 comprises approximately 106 acres of the central part of the MFG Area known as the gravel pits. It lies north of the Tetryl Production Area, east of the TNT Ditch Complex, and west of the Acid Area (Figure 1-2).

Landfill M13 is located in the northern part of Site M13 and comprises approximately 10.5 acres. Site features at Landfill M13 and surrounding areas are illustrated on Figure 3-16. Disposal activities were confined to four discrete areas on the site, none of which extended beyond 12 acres in size. Historical records indicate landfilling took place in the Northern Gravel Pit during the period 1966 to 1984 and involved scrap metals, creosote-treated railroad ties, telephone poles, and construction/demolition debris. Other waste management activities at Site M13 involved explosives. Explosive compounds observed in the groundwater at Site M13 include: TNT, TNB, 2,4-DNT, and 2,6-DNT.

Soil in the vicinity of the Northern Gravel Pit had been found to contain beryllium, lead, and benzo(a)pyrene as COCs. On a single occasion in 1991, antimony and cadmium were reported to be present in groundwater samples at concentrations in excess of their respective RGs, but they have not exceeded the RGs since. It is difficult to determine if the original findings could have resulted from turbid samples since low flow sampling and micro purging techniques are now employed to obtain more representative samples.

The current CSM is that metals and benzo(a)pyrene in groundwater may be present as a result of leaching of waste materials in the Northern Gravel Pit. The explosives present in groundwater are far more likely to be present due to infiltration of wastewater in the TNT Ditch. There is no evidence to suggest explosive compounds were ever present in waste materials put into the pit.

The Northern Gravel Pit was consolidated and capped (Landfill M13) in the 2007 to 2008 time frame. The three other pits received waste materials that do not appear to pose a threat to human health and the environment.

With the implementation of the RA at the TNT Ditch and the capping of the Northern Gravel Pit, it is anticipated that contaminants in site groundwater will detach from the source areas and migrate as legacy plumes to the west. As such, concentrations are expected to decline with time.

Monitoring at Landfill M13 is mandated by IAC Title 5, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for a period of 15 years. Long-term monitoring of the landfill cap will include quarterly inspections of the cap, vegetation, and drainage structures. Objectives include:

- Confirm that the cap has controlled leaching at the landfill so that water quality will not be threatened in the future;
- Ensure that the cap is maintained in a manner that will not increase infiltration in the future or otherwise allow waste to be exposed;
- Keep survey points protected and visible to facilitate identification in the future;
- Ensure the fence and signage installed to restrict site access remain in place and serviceable; and
- Certify that institutional controls remain in place.

The overburden aquifer primarily consists of silt and clay, with abundant sand and gravel in the upper, unsaturated, portion of the aquifer. The overburden thickness is approximately 25 ft and is fairly consistent across Site M13. Samples from overburden wells are obtained from silt and/or clay layers.

### **3.6.1 Groundwater Hydraulics**

The groundwater monitoring network at Landfill M13 consists of 11 wells: 6 overburden wells, 1 combined overburden/bedrock well and 4 bedrock wells. Water levels are measured at the groundwater locations that are sampled (listed below), and at monitoring wells MW350, MW363, and MW364. Monitoring well information and water levels for February and April are summarized in Table 2-2. The groundwater flow direction in the overburden aquifer for the February and April quarterly sampling events is to the south/southeast as shown on Figures 3-16 and 3-17, respectively. Figure 3-17 includes the surrounding groundwater flow taken from the semi-annual sampling event, as shown on Figure 3-10.

The horizontal gradient at Site M13 was calculated to be 0.0048 ft/ft in February and 0.0047 ft/ft in April (Table 3-6). Using an average hydraulic conductivity value of 8.0E-02 cm/sec and an assumed porosity of 0.30, the calculated flow velocity at Site M13 was approximately 3.6 ft/day or 1,296 ft/yr in February and in April (Table 3-7). Chemical data do not support this high of a flow velocity and linear flow velocities are likely on the order of 10 ft/yr based on data from other sites at JOAAP.

The groundwater flow direction in the bedrock aquifer in the immediate vicinity of Landfill M13 for February and April quarterly sampling events was generally toward the southwest as shown on Figures 3-18 and 3-19. Figure 3-19 includes the surrounding groundwater

flow taken from the April semi-annual sampling event, as shown on Figure 3-11. The screens for combination well MW350 and nearby bedrock well MW321 are set at a shallow depth within the bedrock aquifer (<10 ft below top of bedrock), while the well screen for nearby well MW322 is set at an intermediate depth within the bedrock aquifer (10 to 20 ft below top of bedrock). Downward vertical gradients were observed at upgradient well nest MW806/MW807 in February and April and downgradient well nests MW363/MW364 in February and MW808/MW809 in February and April. An upward vertical gradient was observed at downgradient well nests MW126R/MW362 in February and April and MW363/MW364 in April (Table 3-8).

The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically.

### 3.6.2 Analytical Results

Groundwater sampling points for Landfill M13 within the MFG GMZ for the spring 2012 sampling events (quarterly) are summarized in Table 2-1. Monitoring wells AEHA14R and AEHA15 were not sampled in Spring 2012 as recommended in the 2010 Annual Report. The following monitoring wells at Landfill M13 are sampled for VOCs, SVOCs, TAL metals, explosives, nitrate, and sulfate:

- Upgradient – MW806 and MW807
- Downgradient – MW126R, MW362, MW808, and MW809

Groundwater samples were collected at Landfill M13 in February and April, 2012 and were analyzed for explosive compounds, TAL metals, indicator parameters (sulfate and nitrate), VOCs, and SVOCs in accordance with Appendix B (QAPP) of the LTM Plan. Detections of explosive compounds, TAL metals, indicator parameters (sulfate and nitrate), VOCs, and SVOCs for the sampling events conducted at Landfill M13 in spring 2012 are summarized in Tables 3-1, 3-2, 3-3, 3-4, and 3-5, respectively. Explosive compound detections are shown on Figure 3-20. For Landfill M13 the monitoring well locations are classified as upgradient or downgradient locations. A brief discussion of analytical results by well type follows:

***Upgradient (MW806 and MW807):*** There were no detections of explosive compounds for the February or April sampling events.

There were no RG exceedances for metals for the February or April sampling events.

There were no RG exceedances for nitrate or sulfate for the February or April sampling events.

There were no RG exceedances for VOCs for the February or April sampling events. However, at monitoring well MW807, carbon disulfide (2.4 ug/L), 1,1-DCA (1.4 µg/L), and cis-1,2-DCE (0.79 µg/L) were detected below their respective RGs.

There were no detections of SVOCs for the February or April sampling events.

***Downgradient (AEHA14R, AEHA15, MW126R, MW362, MW808, and MW809):*** There were no detections of explosive compounds at monitoring wells MW808, or MW809 for the February or April sampling events. At monitoring well MW126R, 2-NT and 4-NT were detected below their respective RGs for the April sampling event.

At monitoring well MW362, 2,4-DNT exceeded the RG for the February (1.5 ug/L) and April (4.9 ug/L) sampling events and 2-NT and 3-NT were detected at concentrations below their respective RGs for the April sampling event. In addition, TNT degradation products 2-A-4,6-DNT and 4-A-2,6-DNT were also detected at MW362 at low concentrations for the February and April sampling events.

At monitoring well AEHA15, iron was detected above the RG at a concentration of 15 mg/L for the February sampling event.

There were no RG exceedances for nitrate or sulfate for the February or April sampling events.

At monitoring well MW126R, trichloroethene was detected at a concentration of 0.23 ug/L below the RG for the April sampling event.

At monitoring well MW362, 2,4-DNT was not detected in February as it was in the explosives analysis, but exceeded the RG at a concentration of 3.3 ug/L in April which confirmed the exceedance in the explosives analysis.

### **3.6.3 Recommendations**

Sampling at Landfill M13 should be performed during quarterly summer and fall 2012 sampling events as outlined in Table 3-9. An evaluation of the 2,4-DNT exceedances detected at monitoring well MW362 will be completed in the 2012 Annual Groundwater Monitoring Report to include analytical data from the remaining 2012 quarterly sampling events. A monitoring well should be installed downgradient of Site M13 to replace monitoring wells AEHA14R and AEHA15.

#### **4.0 SUMMARY OF RECOMMENDATIONS**

Recommendations included in previous LTM Plan reports relevant to modifications to the Long-Term Monitoring Program are summarized in Table 4-1. The following presents additional recommendations.

- The monitoring program as outlined in Table 3-9 should be implemented for the Fall 2012 sampling event.
- At Landfill L3 the rip rap along Prairie Creek at Site L3 has been washed away at several locations and is in need of repair.
- A monitoring well should be installed downgradient of Site M13 to replace monitoring wells AEHA14R and AEHA15.
- Required monitoring well repairs summarized in Section 2.1.2 will be completed during the fall 2012 sampling round.

## 5.0 REFERENCES

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## TABLES

TABLE 1-1

**Spring 2012 Sample Parameters**  
**2012 Semi-Annual Groundwater Monitoring Report**  
**Joliet Army Ammunition Plant**  
**Will County, Illinois**

| Site               | Well ID                           | Parameter         |
|--------------------|-----------------------------------|-------------------|
| L1                 | <i>In-plume</i>                   |                   |
|                    | MW131                             | E                 |
|                    | MW173                             | E                 |
|                    | WES1                              | E                 |
|                    | <i>Early Warning</i>              |                   |
|                    | WES3                              | E                 |
|                    | MW174                             | E                 |
|                    | <i>Compliance</i>                 |                   |
|                    | SW550                             | E                 |
| L3/<br>Landfill L3 | <i>Upgradient</i>                 |                   |
|                    | SW004                             | E, M              |
|                    | <i>In-plume/Downgradient</i>      |                   |
|                    | MW410                             | E                 |
|                    | MW412                             | E, M              |
|                    | <i>Early Warning/Downgradient</i> |                   |
|                    | MW630                             | E, M              |
|                    | MW631                             | E, M              |
|                    | MW633                             | E, M              |
|                    | <i>Compliance/Downgradient</i>    |                   |
|                    | SW777                             | E, M              |
|                    | <i>Downgradient</i>               |                   |
|                    | SW557                             | E, M              |
|                    | SW558                             | E, M              |
| M1                 | <i>In-plume</i>                   |                   |
|                    | MW107                             | S                 |
|                    | MW231                             | S                 |
|                    | MW640                             | S                 |
|                    | MW641                             | S                 |
|                    | MW642                             | S                 |
|                    | <i>Early Warning</i>              |                   |
|                    | MW643                             | S                 |
|                    | MW644                             | S                 |
|                    | <i>Compliance</i>                 |                   |
|                    | MW645                             | S                 |
|                    | MW646                             | S                 |
|                    | MW648                             | S                 |
|                    | MW649                             | S                 |
|                    | SW709                             | S                 |
| MFG                | <i>In-plume</i>                   |                   |
|                    | MW212R                            | E                 |
|                    | MW330                             | S                 |
|                    | MW652                             | E                 |
|                    | <i>Early Warning</i>              |                   |
|                    | MW123R                            | E                 |
|                    | MW124R                            | E                 |
|                    | MW162R                            | E                 |
|                    | MW313                             | E                 |
|                    | MW318                             | E                 |
|                    | MW319                             | E                 |
|                    | MW654                             | E                 |
|                    | <i>Compliance</i>                 |                   |
|                    | MW117                             | E                 |
|                    | MW118                             | E                 |
|                    | MW119                             | E                 |
| Landfill M11       | <i>Upgradient</i>                 |                   |
|                    | MW802                             | E, I, M, SVOC & V |
|                    | <i>Downgradient</i>               |                   |
|                    | MW335                             | E, I, M, SVOC & V |
|                    | MW336                             | E, I, M, SVOC & V |
| Landfill M13"      | MW805                             | E, I, M, SVOC & V |
|                    | <i>Upgradient</i>                 |                   |
|                    | MW806                             | E, I, M, SVOC & V |
|                    | MW807                             | E, I, M, SVOC & V |
|                    | <i>Downgradient</i>               |                   |
|                    | MW126R                            | E, I, M, SVOC & V |
|                    | MW362                             | E, I, M, SVOC & V |
|                    | MW808                             | E, I, M, SVOC & V |
|                    | MW809                             | E, I, M, SVOC & V |

**General Notes:**

E - Explosives  
M - Metals  
S - Sulfate  
MFG - Manufacturing Area  
I - Indicator parameters (Nitrate-N and Sulfate)  
SVOC - Semivolatile Organic Compound  
V - Volatile Organic Compounds (VOCs)

**Footnotes:**

- (1) Site M13 Landfill monitoring wells were also sampled quarterly in February for these parameters in compliance with Illinois Administrative Code, including wells AEHA14R and AEHA15.

Table 2-1

**Final Field Stabilization Parameters  
2012 Semi-Annual Groundwater Monitoring Report  
Joliet Army Ammunition Plant  
Will County, Illinois**

| Site | Well ID                            | Sample Date | pH (SU) | Specific Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature (°C) | Redox (mV) |
|------|------------------------------------|-------------|---------|-------------------------------|-----------------|-------------------------|------------------|------------|
| L1   | <b>In-plume</b>                    |             |         |                               |                 |                         |                  |            |
|      | MW131                              | 4/12/2012   | 7.06    | 1160                          | 0.2             | 8.03                    | 9.7              | 190        |
|      | MW173                              | 4/11/2012   | 7.34    | 811                           | 0.4             | 4.58                    | 9.0              | 89         |
|      | MW174                              | 4/11/2012   | 7.32    | 823                           | 0.4             | 2.77                    | 8.4              | -18        |
|      | WES1                               | 4/12/2012   | 7.31    | 839                           | 0.0             | 6.77                    | 12.8             | 179        |
|      | <b>Early Warning</b>               |             |         |                               |                 |                         |                  |            |
|      | WES3                               | 4/11/2012   | 7.20    | 775                           | 0.0             | 0.39                    | 13.2             | 140        |
|      | <b>Compliance</b>                  |             |         |                               |                 |                         |                  |            |
|      | SW550                              | 4/14/2012   | 7.67    | 899                           | Moderate        | 15.61                   | 10.4             | 12.3       |
| L3   | <b>Upgradient</b>                  |             |         |                               |                 |                         |                  |            |
|      | SW004                              | 4/10/2012   | 8.00    | 720                           | Moderate        | 10.39                   | 14.5             | 176        |
|      | <b>In-plume/Downgradient</b>       |             |         |                               |                 |                         |                  |            |
|      | MW410                              | 4/11/2012   | 7.57    | 940                           | 12.8            | 2.31                    | 11.2             | 115        |
|      | MW412                              | 4/11/2012   | 7.41    | 819                           | 10.4            | 6.14                    | 8.4              | 139        |
|      | <b>Early wWarning/Downgradient</b> |             |         |                               |                 |                         |                  |            |
|      | MW630                              | 4/11/2012   | 7.42    | 766                           | 3.6             | 6.90                    | 8.8              | 113        |
|      | MW631                              | 4/11/2012   | 7.53    | 692                           | 7.1             | 0.95                    | 9.6              | 157        |
|      | MW633                              | 4/11/2012   | 7.53    | 677                           | 9.2             | 3.54                    | 8.8              | 135        |
|      | <b>Compliance/Downgradient</b>     |             |         |                               |                 |                         |                  |            |
|      | SW777                              | 4/11/2012   | 8.31    | 692                           | Moderate        | 11.14                   | 13.7             | 124        |
|      | <b>Downgradient</b>                |             |         |                               |                 |                         |                  |            |
|      | SW557                              | 4/10/2012   | 8.34    | 710                           | Moderate        | 10.05                   | 14.5             | 149        |
|      | SW558                              | 4/10/2012   | 8.67    | 682                           | Slight to Clear | 10.97                   | 9.5              | 148        |
| M1   | <b>In-plume</b>                    |             |         |                               |                 |                         |                  |            |
|      | MW107                              | 4/12/2012   | 9.76    | 4790                          | 3.3             | 0.59                    | 11.4             | -122       |
|      | MW231                              | 4/12/2012   | 9.40    | 5940                          | 0.0             | 0.38                    | 10.3             | -158       |
|      | MW640                              | 4/12/2012   | 6.90    | 9360                          | 6.1             | 2.54                    | 11.4             | -63        |
|      | MW641                              | 4/12/2012   | 7.37    | 2300                          | 6.9             | 2.92                    | 9.8              | -100       |
|      | MW642                              | 4/12/2012   | 7.47    | 1500                          | 2.6             | 1.96                    | 10.4             | 28         |
|      | <b>Early Warning</b>               |             |         |                               |                 |                         |                  |            |
|      | MW643                              | 4/13/2012   | 7.65    | 839                           | 5.5             | 8.70                    | 10.1             | -47        |
|      | MW644                              | 4/13/2012   | 7.70    | 1090                          | 0.0             | 3.41                    | 10.0             | 130        |
|      | <b>Compliance</b>                  |             |         |                               |                 |                         |                  |            |
|      | MW645                              | 4/13/2012   | 7.44    | 839                           | 1.3             | 2.22                    | 9.5              | 108        |
|      | MW646                              | 4/13/2012   | 7.76    | 903                           | 0.8             | 4.13                    | 9.9              | 115        |
|      | MW648                              | 4/12/2012   | 7.62    | 643                           | 25.9            | 0.75                    | 9.7              | -122       |
|      | MW649                              | 4/13/2012   | 7.60    | 684                           | 0.4             | 1.54                    | 10.0             | 85         |
|      | SW709                              | 4/13/2012   | 7.01    | 750                           | Moderate        | 11.11                   | 12.0             | 14.1       |
| MFG  | <b>In-plume</b>                    |             |         |                               |                 |                         |                  |            |
|      | MW212R                             | 4/15/2012   | 7.51    | 753                           | 2.1             | 6.90                    | 10.8             | 83         |
|      | MW330                              | 4/17/2012   | 7.30    | 1370                          | 13.5            | 5.39                    | 12.6             | 125        |
|      | MW652                              | 4/14/2012   | 7.23    | 1290                          | 0.0             | 0.95                    | 9.8              | 43         |
|      | <b>Early Warning</b>               |             |         |                               |                 |                         |                  |            |
|      | MW123R                             | 4/14/2012   | 6.97    | 1240                          | 2.3             | 0.23                    | 11.2             | -60        |
|      | MW124R                             | 4/14/2012   | 7.07    | 713                           | 9.1             | 0.00                    | 9.9              | -70        |
|      | MW162R                             | 4/14/2012   | 7.07    | 1140                          | 0.0             | 2.00                    | 11.1             | 0          |
|      | MW313                              | 4/15/2012   | 7.77    | 1020                          | 0.0             | 0.34                    | 14.5             | 55         |
|      | MW318                              | 4/14/2012   | 7.36    | 1230                          | 0.1             | 0.00                    | 10.4             | -107       |
|      | MW319                              | 4/14/2012   | 7.55    | 1330                          | 0.7             | 1.94                    | 11.5             | -45        |
|      | MW654                              | 4/15/2012   | 7.54    | 1980                          | 0.0             | 1.79                    | 11.0             | 60         |
|      | <b>Compliance</b>                  |             |         |                               |                 |                         |                  |            |
|      | MW117                              | 4/13/2012   | 7.08    | 950                           | 1.7             | 7.11                    | 10.3             | -113       |
|      | MW118                              | 4/13/2012   | 7.58    | 742                           | 1.2             | 1.75                    | 9.8              | 97         |
|      | MW119                              | 4/13/2012   | 7.28    | 1910                          | 4.6             | 0.00                    | 9.8              | 70         |

Table 2-1

**Final Field Stabilization Parameters  
2012 Semi-Annual Groundwater Monitoring Report  
Joliet Army Ammunition Plant  
Will County, Illinois**

| Site         | Well ID             | Sample Date | pH (SU) | Specific Conductivity (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature (°C) | Redox (mV) |
|--------------|---------------------|-------------|---------|-------------------------------|-----------------|-------------------------|------------------|------------|
| Landfill M11 | <i>Upgradient</i>   |             |         |                               |                 |                         |                  |            |
|              | MW802               | 4/16/2012   | 7.51    | 741                           | 2.6             | 0.84                    | 10.0             | -6         |
|              | <i>Downgradient</i> |             |         |                               |                 |                         |                  |            |
|              | MW335               | 4/16/2012   | 7.61    | 1890                          | 1.1             | 4.35                    | 9.1              | 121        |
|              | MW336               | 4/16/2012   | 7.60    | 1400                          | 4.2             | 2.31                    | 9.3              | 88         |
|              | MW805               | 4/16/2012   | 7.77    | 1510                          | 10.3            | 3.95                    | 10.3             | 95         |
| Landfill M13 | <i>Upgradient</i>   |             |         |                               |                 |                         |                  |            |
|              | MW806               | 2/29/2012   | 7.71    | 751                           | 21.1            | 5.23                    | 11.7             | -43        |
|              |                     | 4/16/2012   | 7.66    | 838                           | 0.0             | 0.99                    | 11.9             | 61         |
|              | MW807               | 2/29/2012   | 7.53    | 3610                          | 0.0             | 0.93                    | 11.9             | -163       |
|              |                     | 4/16/2012   | 7.27    | 3790                          | 0.0             | 0.38                    | 13.4             | -104       |
|              | <i>Downgradient</i> |             |         |                               |                 |                         |                  |            |
|              | AEHA14R             | 3/1/2012    | NM      | NM                            | NM              | NM                      | NM               | NM         |
|              | AEHA15              | 3/1/2012    | NM      | NM                            | NM              | NM                      | NM               | NM         |
|              | MW126R              | 2/29/2012   | 7.50    | 1111                          | 18.3            | 4.11                    | 10.6             | 37         |
|              |                     | 4/16/2012   | 7.41    | 792                           | 0.0             | 0.67                    | 12.2             | 29         |
|              | MW362               | 2/29/2012   | 7.60    | 3028                          | 12.0            | 3.16                    | 11.8             | 67         |
|              |                     | 4/16/2012   | 7.35    | 2860                          | 0.7             | 3.81                    | 12.4             | 108        |
|              | MW808               | 2/29/2012   | 7.00    | 1635                          | 10.6            | 2.11                    | 11.6             | -78        |
|              |                     | 4/16/2012   | 7.16    | 1430                          | 3.2             | 4.09                    | 10.4             | -52        |
|              | MW809               | 2/29/2012   | 7.95    | 623                           | 10.0            | 5.00                    | 11.8             | -165       |
|              |                     | 4/16/2012   | 7.83    | 536                           | 1.3             | 5.36                    | 12.0             | -59        |

General Notes:

ID = identification

SU = standard units

mS/cm = microsiemens per centimeter

NTU = nephelometric turbidity unit

mg/L = milligrams per liter

°C = degrees Centigrade

mV = millivolt

R = Replacement well

NM = not measured

Redox = reduction/oxidation potential

Wells AEHA14R and AEHA15 were not able to be purged prior to collecting a sample. Therefore stabilization criteria were not measured.

TABLE 2-2

Monitoring Well Information - Manufacturing Area  
2012 Semi-Annual Groundwater Monitoring Report  
Joliet Army Ammunition Plant  
Will County, Illinois

| Area/Well ID | Site     | Northing (Feet) | Easting (Feet) | TOC Elevation (MSL) | Ground Elevation (MSL) | Depth to Top of Screen (BGS) | Depth to Bottom of Screen (BGS) | Total Borehole Depth (BGS) | Depth to Water February 2012 (TOC) | Water Elevation February 2012 (MSL) | Depth to Water April 2012 (TOC) | Water Elevation April 2012 (MSL) | Depth to Bedrock From Log (BGS) | Bedrock Elevation from Log (MSL) | Year Installed | Formation Designation | Screen Length (Feet) | Casing & Screen Diameter (Inches) |
|--------------|----------|-----------------|----------------|---------------------|------------------------|------------------------------|---------------------------------|----------------------------|------------------------------------|-------------------------------------|---------------------------------|----------------------------------|---------------------------------|----------------------------------|----------------|-----------------------|----------------------|-----------------------------------|
| MW104        | M1       | 15019989.44     | 1318790.51     | 549.10              | 546.20                 | 7.0                          | 27.0                            | 30.0                       | NM                                 | NM                                  | 6.05                            | 543.05                           | 27.00                           | 519.20                           | 1981           | OVB                   | 20.0                 | 4.0                               |
| MW105        |          | 15020111.69     | 1320854.13     | 555.00              | 552.50                 | 7.0                          | 27.0                            | 29.9                       | NM                                 | NM                                  | 6.01                            | 548.99                           | 24.00                           | 528.50                           | 1981           | COMBO                 | 20.0                 | 4.0                               |
| MW106        |          | 15020948.76     | 1318761.26     | 542.00              | 539.70                 | 10.0                         | 30.0                            | 32.0                       | NM                                 | NM                                  | 3.60                            | 538.40                           | 21.00                           | 518.70                           | 1981           | COMBO                 | 20.0                 | 4.0                               |
| MW107        |          | 15021094.20     | 1320422.28     | 552.40              | 549.10                 | 5.5                          | 25.5                            | 27.4                       | NM                                 | NM                                  | 6.06                            | 546.34                           | 17.00                           | 532.10                           | 1981           | COMBO                 | 20.0                 | 4.0                               |
| MW201        |          | 15020020.57     | 1318931.61     | 546.15              | 544.01                 | 46.5                         | 66.5                            | 70.5                       | NM                                 | NM                                  | 2.88                            | NM                               | 24.00                           | 520.01                           | 1988           | BRK                   | 20.0                 | 4.0                               |
| MW231        |          | 15020828.13     | 1319861.02     | 550.33              | 548.47                 | 6.0                          | 16.0                            | 15.7                       | NM                                 | NM                                  | 3.99                            | 546.34                           | 16.00                           | 532.47                           | 1988           | OVB                   | 10.0                 | 4.0                               |
| MW347        |          | 15020481.00     | 1319594.96     | 551.73              | 549.84                 | 14.4                         | 24.4                            | 27.0                       | NM                                 | NM                                  | 4.81                            | NM                               | 18.50                           | 531.34                           | 1991           | COMBO                 | 10.0                 | 4.0                               |
| MW351        |          | 15021257.77     | 1319798.88     | 548.38              | 545.68                 | 9.5                          | 19.5                            | 22.7                       | NM                                 | NM                                  | 4.91                            | 543.47                           | 22.50                           | 523.18                           | 1991           | OVB                   | 10.0                 | 4.0                               |
| MW640        |          | 15021244.24     | 1319804.02     | 548.12              | 545.40                 | 29.0                         | 39.0                            | 40.0                       | NM                                 | NM                                  | 3.95                            | 544.17                           | 23.00                           | 522.40                           | 1999           | BRK                   | 10.0                 | 4.0                               |
| MW641        |          | 15021873.45     | 1319350.19     | 544.50              | 541.98                 | 7.0                          | 17.0                            | 17.2                       | NM                                 | NM                                  | 2.22                            | 542.28                           | 29.00                           | 516.08                           | 1999           | OVB                   | 10.0                 | 4.0                               |
| MW642        |          | 15021874.37     | 1319339.91     | 544.47              | 541.95                 | 29.0                         | 39.0                            | 40.0                       | NM                                 | NM                                  | 2.75                            | 541.72                           | 29.00                           | 516.08                           | 1999           | OVB                   | 10.0                 | 4.0                               |
| MW643        |          | 15022117.67     | 1318719.85     | 540.03              | 537.55                 | 4.3                          | 7.2                             | 7.8                        | NM                                 | NM                                  | 6.73                            | 533.30                           | 7.25                            | 530.30                           | 2001           | OVB                   | 2.9                  | 4.0                               |
| MW644        |          | 15022128.91     | 1318718.61     | 540.23              | 537.55                 | 10.8                         | 20.4                            | 21.0                       | NM                                 | NM                                  | 6.22                            | 534.01                           | 7.25                            | 530.30                           | 2001           | BRK                   | 9.6                  | 4.0                               |
| MW645        |          | 15022269.11     | 1318648.69     | 541.47              | 538.90                 | 7.5                          | 11.5                            | 12.0                       | NM                                 | NM                                  | 8.53                            | 532.94                           | 10.50                           | 528.40                           | 2001           | OVB                   | 4.0                  | 4.0                               |
| MW646        |          | 15022257.26     | 1318650.53     | 541.48              | 539.09                 | 12.3                         | 21.9                            | 22.5                       | NM                                 | NM                                  | 8.49                            | 532.99                           | 10.50                           | 528.59                           | 2001           | BRK                   | 9.6                  | 4.0                               |
| MW647        |          | 15022572.85     | 1318012.98     | 538.40              | 535.96                 | 7.3                          | 16.9                            | 17.5                       | NM                                 | NM                                  | 5.69                            | 532.71                           | 6.00                            | 529.96                           | 2001           | OVB                   | 9.6                  | 4.0                               |
| MW648        |          | 15022428.25     | 1319438.13     | 546.77              | 544.17                 | 7.3                          | 16.8                            | 17.4                       | NM                                 | NM                                  | 6.03                            | 540.74                           | 13.50                           | 530.67                           | 2001           | OVB                   | 9.6                  | 4.0                               |
| MW649        |          | 15021299.49     | 1318723.15     | 543.10              | 540.49                 | 7.0                          | 16.6                            | 17.2                       | NM                                 | NM                                  | 7.24                            | 535.86                           | 7.50                            | 532.99                           | 2001           | OVB                   | 9.6                  | 4.0                               |
| MW111        | M3       | 15028902.95     | 1318551.57     | 531.80              | 529.40                 | 10.5                         | 54.0                            | UNKNOWN                    | NM                                 | NM                                  | NM                              | NM                               | 10.00                           | 519.40                           | 1981           | BRK                   | 43.5                 | 4.0                               |
| MW112        |          | 15030353.67     | 1318557.88     | 534.10              | 531.70                 | 7.2                          | 27.2                            | UNKNOWN                    | NM                                 | NM                                  | NM                              | NM                               | 8.00                            | 523.70                           | 1981           | BRK                   | 20.0                 | 4.0                               |
| MW113        |          | 15030379.46     | 1319676.13     | 536.32              | 533.70                 | 7.2                          | 27.2                            | UNKNOWN                    | NM                                 | NM                                  | 6.0                             | 530.30                           | 5.00                            | 528.70                           | 1981           | BRK                   | 20.0                 | 4.0                               |
| MW154        |          | 15027749.55     | 1318572.52     | 533.06              | 529.15                 | 5.5                          | 9.1                             | UNKNOWN                    | NM                                 | NM                                  | NM                              | NM                               | 8.00                            | 521.15                           | 1982           | BRK                   | 3.6                  | UNKNOWN                           |
| MW203        |          | 15029235.44     | 1318551.15     | 534.23              | 532.02                 | 10.5                         | 25.5                            | UNKNOWN                    | NM                                 | NM                                  | NM                              | NM                               | 5.50                            | 526.52                           | 1988           | BRK                   | 15.0                 | 4.0                               |
| MW232        |          | 15030123.95     | 1318974.36     | 535.79              | 533.38                 | 20.0                         | 35.0                            | UNKNOWN                    | NM                                 | NM                                  | NM                              | NM                               | 7.00                            | 526.38                           | 1988           | BRK                   | 15.0                 | 4.0                               |
| MW233        |          | 15029737.88     | 1319024.94     | 535.58              | 532.96                 | 10.0                         | 25.0                            | UNKNOWN                    | NM                                 | NM                                  | NM                              | NM                               | 2.50                            | 530.46                           | 1988           | BRK                   | 15.0                 | 4.0                               |
| MW348        |          | 15029911.26     | 1318978.02     | 535.71              | 532.61                 | 16.5                         | 31.5                            | UNKNOWN                    | NM                                 | NM                                  | NM                              | NM                               | 3.00                            | 529.61                           | 1991           | BRK                   | 15.0                 | 4.0                               |
| MW352        |          | 15029602.85     | 1318617.32     | 534.89              | 532.33                 | 19.0                         | 34.0                            | UNKNOWN                    | NM                                 | NM                                  | NM                              | NM                               | 6.00                            | 526.33                           | 1991           | BRK                   | 15.0                 | 4.0                               |
| MW353        |          | 15030120.63     | 1318562.29     | 534.64              | 531.86                 | 17.0                         | 32.0                            | UNKNOWN                    | NM                                 | NM                                  | NM                              | NM                               | 2.00                            | 529.86                           | 1991           | BRK                   | 15.0                 | 4.0                               |
| MW115        | MFG (M4) | 15032589.49     | 1318485.27     | 533.40              | 530.80                 | 7.2                          | 27.2                            | UNKNOWN                    | NM                                 | NM                                  | 4.59                            | 528.81                           | 2.00                            | 528.80                           | 1981           | BRK                   | 20.0                 | 4.0                               |
| MW157        |          | 15032947.33     | 1319827.02     | 535.02              | 531.37                 | 3.7                          | 10.2                            | UNKNOWN                    | NM                                 | NM                                  | 4.68                            | 530.34                           | 11.00                           | 520.37                           | 1982           | COMBO                 | 6.5                  | 2.0                               |
| MW158        |          | 15032970.89     | 1319820.01     | 534.40              | 531.58                 | 9.0                          | 29.5                            | 31.9                       | NM                                 | NM                                  | 4.06                            | 530.34                           | 5.00                            | 526.58                           | 1982           | BRK                   | 20.5                 | 3.0                               |
| MW114R       | MFG (M5) | 15031315.26     | 1323651.56     | 556.80              | 554.9                  | 6.5                          | 21.5                            | 22.0                       | NM                                 | NM                                  | NM                              | NM                               | 15.00                           | 539.90                           | 2001           | COMBO                 | 15.0                 | 4.0                               |
| MW127R       |          | 15032537.25     | 1326273.84     | 596.04              | 592.9                  | 30.0                         | 45.0                            | 46.0                       | NM                                 | NM                                  | 42.29                           | 553.75                           | 40.00                           | 552.90                           | 2001           | COMBO                 | 15.0                 | 4.0                               |
| MW207R       |          | 15032188.92     | 1323779.72     | 560.21              | 557.5                  | 7.0                          | 17.0                            | 18.0                       | NM                                 | NM                                  | NM                              | NM                               | UNKNOWN                         | UNKNOWN                          | 2001           | OVB                   | 10.0                 | 4.0                               |
| MW354R       |          | 15031780.18     | 1323424.19     | 559.61              | 557.6                  | 7.0                          | 17.0                            | 18.0                       | NM                                 | NM                                  | 13.69                           | 545.92                           | 19.00                           | 538.60                           | 2001           | COMBO                 | 10.0                 | 4.0                               |
| MW355R       |          | 15030827.10     | 1323676.76     | 558.12              | 555.7                  | 10.0                         | 20.0                            | 22.0                       | NM                                 | NM                                  | NM                              | NM                               | 15.00                           | 540.70                           | 2001           | COMBO                 | 10.0                 | 4.0                               |
| MW356R       |          | 15031372.45     | 1322053.98     | 558.08              | 556.1                  | 24.5                         | 34.5                            | 35.0                       | NM                                 | NM                                  | 16.05                           | 542.03                           | 20.00                           | 536.10                           | 2001           | BRK                   | 10.0                 | 4.0                               |
| MW117        | MFG (M6) | 15036450.18     | 1318407.67     | 529.10              | 526.90                 | 7.7                          | 27.7                            | UNKNOWN                    | NM                                 | NM                                  | 4.75                            | 524.35                           | 12.00                           | 514.90                           | 1981           | COMBO                 | 20.0                 | 4.0                               |
| MW122        |          | 15038443.33     | 1321304.96     | 540.10              | 537.40                 | 7.0                          | 27.0                            | UNKNOWN                    | NM                                 | NM                                  | 4.60                            | 535.50                           | 6.50                            | 530.90                           | 1981           | BRK                   | 20.0                 | 4.0                               |
| MW123R       |          | 15035314.93     | 1320626.07     | 537.22              | 534.9                  | 15.0                         | 30.0                            | 32.0                       | NM                                 | NM                                  | 5.48                            | 531.74                           | 10.00                           | 524.90                           | 2001           | BRK                   | 15.0                 | 4.0                               |
| MW125R       |          | 15037201.55     | 1322981.58     | 567.69              | 565.1                  | 12.0                         | 32.0                            | 33.0                       | NM                                 | NM                                  | 14.27                           | 553.42                           | 26.00                           | 539.10                           | 2001           | COMBO                 | 20.0                 | 4.0                               |
| MW160        |          | 15034274.88     | 1321203.86     | 542.29              | 538.20                 | 3.3                          | 6.3                             | 10.4                       | NM                                 | NM                                  | 6.83                            | 535.46                           | 6.00                            | 532.20                           | 1982           | OVB                   | 3.0                  | 2.0                               |
| MW162R       |          | 15035325.72     | 1320625.78     | 540.19              | 537.7                  | 4.5                          | 9.5                             | 10.0                       | NM                                 | NM                                  | 5.41                            | 534.78                           | UNKNOWN                         | UNKNOWN                          | 2001           | OVB                   | 5.0                  | 4.0                               |
| MW164        |          | 15037035.66     | 1321868.53     | 545.21              | 541.69                 | 3.0                          | 6.0                             | 9.7                        | NM                                 | NM                                  | 6.49                            | 538.72                           | 6.00                            | 535.69                           | 1982           | OVB                   | 3.0                  | 4.0                               |
| MW165        |          | 15037644.18     | 1321700.33     | 544.01              | 540.31                 | 2.8                          | 5.3                             | 9.0                        | NM                                 | NM                                  | 5.80                            | 538.21                           | 5.00                            | 535.31                           | 1982           | OVB                   | 2.5                  | 4.0                               |
| MW166R       |          | 15039129.45     | 1322674.99     | 558.21              | 555.6                  | 10.0                         | 20.0                            | 21.0                       | NM                                 | NM                                  | 13.70                           | 544.51                           | UNKNOWN                         | UNKNOWN                          | 2001           | OVB                   | 10.0                 | 4.0                               |
| MW208        |          | 15035028.45     | 1320126.91     | 538.38              | 535.10                 | 12.0                         | 27.0                            | 30.1                       | NM                                 | NM                                  | 5.91                            | 532.47                           | 4.00                            | 531.10                           | 1988           | BRK                   | 15.0                 | 4.0                               |
| MW209        |          | 15037473.35     | 1320271.28     | 537.75              | 534.89                 | 19.5                         | 34.5                            | UNKNOWN                    | NM                                 | NM                                  | 4.37                            | 533.38                           | 11.10                           | 523.79                           | 1988           | BRK                   | 15.0                 | 4.0                               |
| MW210R       |          | 15035465.00     | 1322154.00     | 565.83              | 564.30                 | 10.7                         | 20.0                            | 20.0                       | NM                                 | NM                                  | 10.74                           | 555.09                           | UNKNOWN                         | UNKNOWN                          | 1998           | OVB                   | 10.0                 | 4.0                               |
| MW212R       |          | 15035415.00     | 1321862.00     | 567.74              | 565.30                 | 9.5                          | 19.5                            | 21.0                       | NM                                 | NM                                  | 14.74                           | 553.00                           | UNKNOWN                         | UNKNOWN                          | 1998           | OVB                   | 10.0                 | 4.0                               |
| MW213R       |          | 15035462.00     | 1322159.00     | 566.49              | 564.30                 | 38.0                         | 53.0                            | 54.0                       | NM                                 | NM                                  | 19.47                           | 547.02                           | 30.50                           | 533.80                           | 1998           | BRK                   | 15.0                 | 4.0                               |

TABLE 2-2

Monitoring Well Information - Manufacturing Area  
2012 Semi-Annual Groundwater Monitoring Report  
Joliet Army Ammunition Plant  
Will County, Illinois

| Area/Well ID | Site              | Northing (Feet) | Easting (Feet) | TOC Elevation (MSL) | Ground Elevation (MSL) | Depth to Top of Screen (BGS) | Depth to Bottom of Screen (BGS) | Total Borehole Depth (BGS) | Depth to Water February 2012 (TOC) | Water Elevation February 2012 (MSL) | Depth to Water April 2012 (TOC) | Water Elevation April 2012 (MSL) | Depth to Bedrock From Log (BGS) | Bedrock Elevation from Log (MSL) | Year Installed | Formation Designation | Screen Length (Feet) | Casing & Screen Diameter (Inches) |
|--------------|-------------------|-----------------|----------------|---------------------|------------------------|------------------------------|---------------------------------|----------------------------|------------------------------------|-------------------------------------|---------------------------------|----------------------------------|---------------------------------|----------------------------------|----------------|-----------------------|----------------------|-----------------------------------|
| MW215R       | MFG (M6)          | 15035410.00     | 1321863.00     | 567.27              | 565.30                 | 38.5                         | 53.5                            | 54.5                       | NM                                 | NM                                  | 21.12                           | 546.15                           | 30.00                           | 535.30                           | 1998           | BRK                   | 15.0                 | 4.0                               |
| MW307        |                   | 15033821.00     | 1321855.79     | 563.56              | 561.45                 | 17.0                         | 27.0                            | 31.7                       | NM                                 | NM                                  | 19.55                           | 544.01                           | UNKNOWN                         | UNKNOWN                          | 1991           | OVB                   | 10.0                 | 4.0                               |
| MW308        |                   | 15033810.75     | 1321837.62     | 563.84              | 561.38                 | 50.5                         | 65.5                            | 71.8                       | NM                                 | NM                                  | 21.58                           | 542.26                           | 35.00                           | 526.38                           | 1991           | BRK                   | 15.0                 | 4.0                               |
| MW309        |                   | 15034826.80     | 1321825.25     | 565.59              | 563.43                 | 12.7                         | 27.7                            | 30.6                       | NM                                 | NM                                  | 11.26                           | 554.33                           | 30.00                           | 533.43                           | 1991           | OVB                   | 15.0                 | 4.0                               |
| MW310R       |                   | 15034823.00     | 1321824.00     | 565.17              | 563.00                 | 44.5                         | 59.5                            | 60.0                       | NM                                 | NM                                  | 22.06                           | 543.11                           | 31.00                           | 532.00                           | 1998           | BRK                   | 15.0                 | 4.0                               |
| MW311        |                   | 15038100.41     | 1322342.54     | 548.85              | 546.36                 | 14.0                         | 24.0                            | 26.4                       | NM                                 | NM                                  | 1.31                            | 547.54                           | 7.00                            | 539.36                           | 1991           | BRK                   | 10.0                 | 4.0                               |
| MW312        | MFG (M6)          | 15038100.56     | 1322332.55     | 548.59              | 545.96                 | 40.0                         | 55.0                            | 58.1                       | NM                                 | NM                                  | 1.04                            | 547.55                           | 7.00                            | 538.96                           | 1991           | BRK                   | 15.0                 | 4.0                               |
| MW313        |                   | 15037051.68     | 1321933.96     | 551.07              | 549.20                 | 25.0                         | 40.0                            | 40.9                       | NM                                 | NM                                  | 12.03                           | 539.04                           | 12.00                           | 537.20                           | 1991           | BRK                   | 15.0                 | 4.0                               |
| MW314        |                   | 15034383.61     | 1321451.49     | 542.32              | 539.53                 | 9.7                          | 14.7                            | 17.8                       | NM                                 | NM                                  | 6.90                            | 535.42                           | 7.20                            | 532.33                           | 1991           | BRK                   | 5.0                  | 4.0                               |
| MW315        |                   | 15034394.61     | 1321451.65     | 541.60              | 538.91                 | 29.7                         | 44.7                            | 47.9                       | NM                                 | NM                                  | 6.19                            | 535.41                           | 6.50                            | 532.41                           | 1991           | BRK                   | 15.0                 | 4.0                               |
| MW316        |                   | 15036232.25     | 1321257.09     | 542.89              | 540.49                 | 13.0                         | 18.0                            | 20.9                       | NM                                 | NM                                  | 6.15                            | 536.74                           | 7.50                            | 532.99                           | 1991           | BRK                   | 5.0                  | 4.0                               |
| MW317        |                   | 15036222.43     | 1321257.70     | 542.96              | 540.71                 | 34.0                         | 49.0                            | UNKNOWN                    | NM                                 | NM                                  | 6.68                            | 536.28                           | 8.00                            | 532.71                           | 1991           | BRK                   | 15.0                 | 4.0                               |
| MW318        |                   | 15037189.67     | 1321488.64     | 547.67              | 545.23                 | 11.8                         | 21.8                            | 24.2                       | NM                                 | NM                                  | 10.12                           | 537.55                           | 11.50                           | 533.73                           | 1991           | BRK                   | 10.0                 | 4.0                               |
| MW319        |                   | 15037202.65     | 1321489.84     | 548.10              | 545.49                 | 40.0                         | 55.0                            | 57.0                       | NM                                 | NM                                  | 10.43                           | 537.67                           | 12.00                           | 533.49                           | 1991           | BRK                   | 15.0                 | 4.0                               |
| MW320R       |                   | 15039129.65     | 1322656.01     | 557.09              | 554.6                  | 30.5                         | 45.5                            | 46.0                       | NM                                 | NM                                  | 12.46                           | 544.63                           | UNKNOWN                         | UNKNOWN                          | 2001           | OVB                   | 15.0                 | 4.0                               |
| MW650        |                   | 15037950.23     | 1322587.98     | 566.45              | 563.83                 | 12.0                         | 22.0                            | 22.5                       | NM                                 | NM                                  | 10.84                           | 555.61                           | UNKNOWN                         | UNKNOWN                          | 1999           | OVB                   | 10.0                 | 4.0                               |
| MW651        |                   | 15037939.17     | 1322583.70     | 566.88              | 563.83                 | 36.0                         | 46.0                            | 47.0                       | NM                                 | NM                                  | 18.29                           | 548.59                           | 23.00                           | 560.83                           | 1999           | BRK                   | 10.0                 | 4.0                               |
| MW652        |                   | 15037004.90     | 1322243.13     | 565.03              | 561.93                 | 11.0                         | 21.0                            | 22.0                       | NM                                 | NM                                  | 11.31                           | 553.72                           | UNKNOWN                         | UNKNOWN                          | 1999           | OVB                   | 10.0                 | 4.0                               |
| MW653        |                   | 15036994.58     | 1322239.14     | 564.60              | 561.93                 | 36.0                         | 46.0                            | 47.0                       | NM                                 | NM                                  | 17.69                           | 546.91                           | 25.00                           | 536.93                           | 1999           | BRK                   | 10.0                 | 4.0                               |
| MW654        |                   | 15037070.77     | 1321976.938.79 | 551.15              | 548.49                 | 13.0                         | 23.0                            | 24.0                       | NM                                 | NM                                  | 12.55                           | 538.60                           | 10.50                           | 539.00                           | 1999           | BRK                   | 10.0                 | 4.0                               |
| MW655        |                   | 15034232.30     | 1320633.23     | 540.19              | 537.71                 | UNKNOWN                      | UNKNOWN                         | UNKNOWN                    | NM                                 | NM                                  | 7.46                            | 532.73                           | 5.00                            | 532.70                           | 1999           | BRK                   | UNKNOWN              | 4.0                               |
| MW662        |                   | 15039862.64     | 1321841.47     | 547.56              | UNKNOWN                | 6.0                          | 16.0                            | 18.0                       | NM                                 | NM                                  | 9.15                            | 538.41                           | 20.00                           | UNKNOWN                          | 2001           | OVB                   | 10.0                 | 4.0                               |
| MW663        |                   | 15039854.92     | 1321841.41     | 547.86              | UNKNOWN                | 30.0                         | 40.0                            | 41.0                       | NM                                 | NM                                  | 9.31                            | 538.55                           | 20.00                           | UNKNOWN                          | 2001           | BRK                   | 10.0                 | 4.0                               |
| MW664        |                   | 15040136.57     | 1322326.42     | 547.43              | UNKNOWN                | 5.0                          | 10.0                            | 10.5                       | NM                                 | NM                                  | 8.62                            | 538.81                           | 10.00                           | UNKNOWN                          | 2001           | OVB                   | 5.0                  | 4.0                               |
| MW665        |                   | 15040145.71     | 1322327.45     | 546.98              | UNKNOWN                | 28.0                         | 38.0                            | 40.0                       | NM                                 | NM                                  | 4.94                            | 542.04                           | 10.00                           | UNKNOWN                          | 2001           | BRK                   | 10.0                 | 4.0                               |
| MW124R       | MFG (M7)          | 15033133.00     | 1320756.00     | 537.25              | 534.70                 | 6.0                          | 16.0                            | 16.0                       | NM                                 | NM                                  | 2.90                            | 534.35                           | 5.00                            | UNKNOWN                          | 1998           | BRK                   | 10.0                 | 4.0                               |
| MW156        |                   | 15032408.65     | 1321713.49     | 541.35              | 537.45                 | 1.7                          | 5.2                             | UNKNOWN                    | NM                                 | NM                                  | 5.84                            | 535.51                           | 5.30                            | 532.15                           | 1982           | OVB                   | 3.5                  | 4.0                               |
| MW159        |                   | 15033457.92     | 1320537.11     | 537.80              | 533.54                 | 4.4                          | 9.4                             | 12.8                       | NM                                 | NM                                  | 6.62                            | 531.18                           | 5.70                            | 527.84                           | 1982           | COMBO                 | 5.0                  | 4.0                               |
| MW216        |                   | 15033525.60     | 1320650.62     | 538.03              | 536.51                 | 5.0                          | 10.0                            | 36.7                       | NM                                 | NM                                  | 6.60                            | 531.43                           | 11.00                           | 525.51                           | 1988           | OVB                   | 5.0                  | 4.0                               |
| MW217        |                   | 15033449.66     | 1320652.62     | 538.97              | 536.90                 | 19.5                         | 34.5                            | 12.0                       | NM                                 | NM                                  | 7.03                            | 531.94                           | 13.40                           | 523.50                           | 1988           | BRK                   | 15.0                 | 4.0                               |
| MW321        |                   | 15033167.53     | 1321626.52     | 545.55              | 542.93                 | 13.5                         | 23.5                            | 26.6                       | NM                                 | NM                                  | 7.82                            | 537.73                           | 9.50                            | 533.43                           | 1991           | BRK                   | 10.0                 | 4.0                               |
| MW322        |                   | 15033161.04     | 1321640.23     | 544.54              | 542.26                 | 34.5                         | 49.5                            | 51.5                       | NM                                 | NM                                  | 10.75                           | 533.79                           | 9.00                            | 533.26                           | 1991           | BRK                   | 15.0                 | 4.0                               |
| MW660        |                   | 15032597.24     | 1320677.38     | 539.73              | 537.08                 | 7.0                          | 12.0                            | 12.6                       | NM                                 | NM                                  | 5.85                            | 533.88                           | UNKNOWN                         | UNKNOWN                          | 1999           | OVB                   | 5.0                  | 4.0                               |
| MW661        |                   | 15032587.16     | 1320679.22     | 539.57              | 537.09                 | 20.0                         | 30.0                            | 30.0                       | NM                                 | NM                                  | 6.75                            | 532.82                           | UNKNOWN                         | UNKNOWN                          | 1999           | OVB                   | 10.0                 | 4.0                               |
| MW147R       | MFG (M8)          | 15037926.87     | 1323318.04     | 567.82              | 564.0                  | 6.5                          | 21.5                            | 22.0                       | NM                                 | NM                                  | 11.42                           | 556.40                           | UNKNOWN                         | UNKNOWN                          | 2001           | OVB                   | 15.0                 | 4.0                               |
| MW148R       |                   | 15038954.52     | 1323542.19     | 561.59              | 560.7                  | 8.0                          | 23.0                            | 23.5                       | NM                                 | NM                                  | 15.90                           | 545.69                           | 18.00                           | 542.70                           | 2001           | COMBO                 | 15.0                 | 4.0                               |
| MW323R       |                   | 15036514.75     | 1323739.67     | 566.00              | 563.5                  | 8.0                          | 18.0                            | 18.5                       | NM                                 | NM                                  | 1.88                            | 564.12                           | UNKNOWN                         | UNKNOWN                          | 2001           | OVB                   | 10.0                 | 4.0                               |
| MW324R       |                   | 15038125.44     | 1323502.88     | 566.23              | 562.7                  | 9.5                          | 19.5                            | 20.0                       | NM                                 | NM                                  | 15.78                           | 550.45                           | UNKNOWN                         | UNKNOWN                          | 2001           | OVB                   | 10.0                 | 4.0                               |
| MW325R       |                   | 15036105.38     | 1322633.31     | 569.62              | 566.9                  | 7.0                          | 17.0                            | 18.0                       | NM                                 | NM                                  | 13.77                           | 555.85                           | UNKNOWN                         | UNKNOWN                          | 2001           | OVB                   | 10.0                 | 4.0                               |
| MW327R       |                   | 15035974.93     | 1324366.55     | 565.27              | 562.57                 | 13.5                         | 18.5                            | 19.0                       | NM                                 | NM                                  | 12.31                           | 552.96                           | 17.00                           | UNKNOWN                          | 2001           | COMBO                 | 5.0                  | 4.0                               |
| MW121        | MFG (M9)          | 15040140.83     | 1323725.54     | 575.75              | 572.50                 | 10.0                         | 30.0                            | 14.2                       | NM                                 | NM                                  | 18.92                           | 556.83                           | UNKNOWN                         | UNKNOWN                          | 1981           | OVB                   | 20.0                 | 4.0                               |
| MW328        |                   | 15040352.78     | 1323793.00     | 582.93              | 580.72                 | 18.0                         | 28.0                            | 19.7                       | NM                                 | NM                                  | 24.68                           | 558.25                           | UNKNOWN                         | UNKNOWN                          | 1991           | OVB                   | 10.0                 | 4.0                               |
| MW330        | MFG (Other Areas) | 15040218.36     | 1323970.19     | 580.33              | 578.20                 | 15.0                         | 25.0                            | 17.0                       | NM                                 | NM                                  | 22.35                           | 557.98                           | UNKNOWN                         | UNKNOWN                          | 1991           | OVB                   | 10.0                 | 4.0                               |
| MW116        |                   | 15034538.62     | 1318460.26     | 535.20              | 532.60                 | 7.0                          | 27.0                            | UNKNOWN                    | NM                                 | NM                                  | 6.33                            | 528.87                           | 5.00                            | 527.60                           | 1981           | BRK                   | 20.0                 | 4.0                               |
| MW118        |                   | 15039343.51     | 1318362.19     | 534.00              | 531.20                 | 8.0                          | 23.0                            | UNKNOWN                    | NM                                 | NM                                  | 3.71                            | 530.29                           | 2.50                            | 528.70                           | 1981           | BRK                   | 15.0                 | 4.0                               |
| MW119        |                   | 15040962.12     | 1320127.86     | 538.90              | 535.50                 | 3.3                          | 23.3                            | UNKNOWN                    | NM                                 | NM                                  | 6.21                            | 532.69                           | 6.00                            | 529.50                           | 1981           | BRK                   | 20.0                 | 4.0                               |
| MW108        | M11               | 15025248.13     | 1320261.16     | 543.60              | 540.80                 | 7.0                          | 27.0                            | UNKNOWN                    | NM                                 | NM                                  | 7.97                            | 535.63                           | 9.00                            | 531.80                           | 1981           | BRK                   | 20.0                 | 4.0                               |
| MW333        |                   | 15026529.41     | 1319776.92     | 536.41              | 533.63                 | 17.9                         | 32.9                            | UNKNOWN                    | NM                                 | NM                                  | 2.78                            | 533.63                           | 5.00                            | 528.63                           | 1991           | BRK                   | 15.0                 | 4.0                               |
| MW334        |                   | 15025998.41     | 1319521.79     | 536.22              | 533.40                 | 19.0                         | 34.0                            | UNKNOWN                    | NM                                 | NM                                  | 3.41                            | 532.81                           | 5.00                            | 528.40                           | 1991           | BRK                   | 15.0                 | 4.0                               |
| MW335        |                   | 15025671.86     | 1319364.79     | 538.36              | 535.66                 | 9.4                          | 19.4                            | UNKNOWN                    | NM                                 | NM                                  | 6.11                            | 532.25                           | 6.00                            | 529.66                           | 1991           | BRK                   | 10.0                 | 4.0                               |
| MW336        |                   | 15025322.08     | 1319223.43     | 537.28              | 534.79                 | 12.0                         | 22.0                            | UNKNOWN                    | NM                                 | NM                                  | 7.65                            | 529.63                           | 7.50                            | 527.29                           | 1991           | BRK                   | 10.0                 | 4.0                               |
| MW337        |                   | 15024991.97     | 1319103.37     | 536.96              | 534.32                 | 21.1                         | 36.1                            | UNKNOWN                    | NM                                 | NM                                  | 5.71                            | 531.25                           | 6.50                            | 527.82                           | 1991           | BRK                   | 15.0                 | 4.0                               |

TABLE 2-2

Monitoring Well Information - Manufacturing Area  
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Joliet Army Ammunition Plant  
Will County, Illinois

| Area/Well ID | Site | Northing (Feet) | Easting (Feet) | TOC Elevation (MSL) | Ground Elevation (MSL) | Depth to Top of Screen (BGS) | Depth to Bottom of Screen (BGS) | Total Borehole Depth (BGS) | Depth to Water February 2012 (TOC) | Water Elevation February 2012 (MSL) | Depth to Water April 2012 (TOC) | Water Elevation April 2012 (MSL) | Depth to Bedrock From Log (BGS) | Bedrock Elevation from Log (MSL) | Year Installed | Formation Designation | Screen Length (Feet) | Casing & Screen Diameter (Inches) |
|--------------|------|-----------------|----------------|---------------------|------------------------|------------------------------|---------------------------------|----------------------------|------------------------------------|-------------------------------------|---------------------------------|----------------------------------|---------------------------------|----------------------------------|----------------|-----------------------|----------------------|-----------------------------------|
| MW338        | M11  | 15024414.06     | 1318777.52     | 537.73              | 534.70                 | 13.5                         | 28.5                            | UNKNOWN                    | NM                                 | NM                                  | 5.28                            | 532.45                           | 3.00                            | 531.70                           | 1991           | BRK                   | 15.0                 | 4.0                               |
| MW339        |      | 15023897.93     | 1318660.60     | 541.27              | 538.41                 | 9.7                          | 19.7                            | UNKNOWN                    | NM                                 | NM                                  | 8.44                            | 532.83                           | 9.00                            | 529.41                           | 1991           | BRK                   | 10.0                 | 4.0                               |
| MW340        |      | 15023157.68     | 1318683.22     | 542.47              | 539.83                 | 7.0                          | 17.0                            | UNKNOWN                    | NM                                 | NM                                  | 8.70                            | 533.77                           | 10.00                           | 529.83                           | 1991           | COMBO                 | 10.0                 | 4.0                               |
| MW802        |      | 15025690.00     | 1320235.70     | 543.42              | 541.62                 | 5.0                          | 15.0                            | 15.0                       | NM                                 | NM                                  | 6.69                            | 536.73                           | 9.50                            | 532.12                           | 2008           | COMBO                 | 10.0                 | 4.0                               |
| MW803        |      | 15025697.70     | 1320237.50     | 543.66              | 541.56                 | 26.5                         | 36.5                            | 36.5                       | NM                                 | NM                                  | 3.39                            | 540.27                           | 9.50                            | 532.06                           | 2008           | BRK                   | 10.0                 | 4.0                               |
| MW804        |      | 15025916.10     | 1319219.30     | 536.48              | 533.78                 | 5.0                          | 15.0                            | 15.0                       | NM                                 | NM                                  | 5.07                            | 531.41                           | 3.50                            | 530.28                           | 2008           | COMBO                 | 10.0                 | 4.0                               |
| MW805        |      | 15025913.60     | 1319229.60     | 536.27              | 533.62                 | 25.0                         | 35.0                            | 35.0                       | NM                                 | NM                                  | 5.18                            | 531.09                           | 3.50                            | 530.12                           | 2008           | BRK                   | 10.0                 | 4.0                               |
| AEHA14R      | M13  | 15034927.28     | 1322519.89     | 569.73              | 567.03                 | 16.5                         | 26.5                            | 27.0                       | 17.76                              | 551.97                              | 17.83                           | 551.90                           | UNKNOWN                         | UNKNOWN                          | 2001           | OVB                   | 10.0                 | 4.0                               |
| AEHA15       |      | 15034695.41     | 1322493.87     | 570.38              | 567.32                 | UNKNOWN                      | UNKNOWN                         | 36.5                       | 20.17                              | 550.21                              | 21.07                           | 549.31                           |                                 | 567.32                           | UNKNOWN        | OVB                   | UNKNOWN              | 2.0                               |
| MW126R       |      | 15034092.63     | 1323332.31     | 562.41              | 563.00                 | 11.0                         | 21.0                            | 22.0                       | 16.03                              | 546.38                              | 15.95                           | 546.46                           | UNKNOWN                         | UNKNOWN                          | 2004           | OVB                   | 10.0                 | 4.0                               |
| MW350        |      | 15032810.11     | 1321811.02     | 554.34              | 552.34                 | 12.5                         | 22.5                            | 24.8                       | NM                                 | NM                                  | 15.58                           | 538.76                           | 19.00                           | 533.34                           | 1991           | COMBO                 | 10.0                 | 4.0                               |
| MW362        |      | 15034100.64     | 1323339.44     | 562.46              | 562.78                 | 28.0                         | 33.0                            | 34.0                       | 13.11                              | 549.35                              | 13.25                           | 549.21                           | 29.50                           | 533.28                           | 2004           | BRK                   | 5.0                  | 4.0                               |
| MW363        |      | 15032768.31     | 1322536.05     | 570.03              | 567.66                 | 21.0                         | 31.0                            | 32.0                       | 27.85                              | 542.18                              | 27.90                           | 542.13                           | 31.50                           | 536.16                           | 2004           | OVB                   | 10.0                 | 4.0                               |
| MW364        |      | 15032775.38     | 1322527.16     | 569.82              | 567.69                 | 37.0                         | 42.0                            | 42.5                       | 27.72                              | 542.10                              | 27.68                           | 542.14                           | 31.50                           | 536.19                           | 2004           | BRK                   | 5.0                  | 4.0                               |
| MW806        |      | 15034807.20     | 1323337.90     | 565.53              | UNKNOWN                | 15.0                         | 25.0                            | 25.0                       | 13.98                              | 551.55                              | 14.09                           | 551.44                           | 29.00                           | UNKNOWN                          | 2008           | OVB                   | 10.0                 | 4.0                               |
| MW807        |      | 15034817.40     | 1323338.10     | 565.79              | UNKNOWN                | 35.0                         | 45.0                            | 45.0                       | 15.41                              | 550.38                              | 15.63                           | 550.16                           | 29.00                           | UNKNOWN                          | 2008           | BRK                   | 10.0                 | 4.0                               |
| MW808        |      | 15034539.90     | 1322493.10     | 569.23              | UNKNOWN                | 15.0                         | 25.0                            | 25.0                       | 17.38                              | 551.85                              | 17.09                           | 552.14                           | 30.00                           | UNKNOWN                          | 2008           | OVB                   | 10.0                 | 4.0                               |
| MW809        |      | 15034530.20     | 1322492.90     | 569.18              | UNKNOWN                | 35.0                         | 45.0                            | 45.0                       | 20.11                              | 549.07                              | 20.32                           | 548.86                           | 30.00                           | UNKNOWN                          | 2008           | BRK                   | 10.0                 | 4.0                               |

Notes:  
Coordinates are Universal Transverse Mercator (UTM), Zone 16 East, North American Datum 1983 (NAD83)  
UNKNOWN = indicate data not presented on borelogs or provided in RI/FS documentation.  
NM = Not Applicable, water levels not measured.  
BRK = Bedrock  
OVB = Overburden  
COMBO = Combination Overburden and Bedrock Well  
MSL = Feet relative to mean seal level  
BGS = Feet below ground surface  
ID = identification  
TOC = Top of Casing

TABLE 2-3

Monitoring Well Information - LAP Area  
2012 Semi-Annual Groundwater Monitoring Report  
Joliet Army Ammunition Plant  
Will County, Illinois

| Area/Well ID | Site | Northing (Feet) | Easting (Feet) | TOC Elevation (MSL) | Ground Elevation (MSL) | Depth to Top of Screen (BGS) | Depth to Bottom of Screen (BGS) | Total Borehole Depth (BGS) | Depth to Water April 2012 (TOC) | Water Elevation April 2012 (MSL) | Depth to Bedrock From Log (BGS) | Bedrock Elevation from Log (MSL) | Year Installed | Formation Designation | Screen Length (Feet) | Casing & Screen Diameter (Inches) |
|--------------|------|-----------------|----------------|---------------------|------------------------|------------------------------|---------------------------------|----------------------------|---------------------------------|----------------------------------|---------------------------------|----------------------------------|----------------|-----------------------|----------------------|-----------------------------------|
| MW131        | L1   | 15029483.20     | 1344039.100    | 625.01              | 622.29                 | 2.5                          | 22.5                            | 24.0                       | 18.02                           | 606.99                           | UNKNOWN                         | UNKNOWN                          | 1981           | OVB                   | 20.0                 | 4.0                               |
| MW171        |      | 15028774.67     | 1343406.032    | 618.24              | 615.03                 | 2.9                          | 7.9                             | 11.1                       | 10.75                           | 607.49                           | 8.00                            | 607.03                           | 1982           | OVB                   | 5.0                  | 4.0                               |
| MW172        |      | 15028836.84     | 1344094.147    | 615.87              | 613.19                 | 14.5                         | 34.5                            | 37.5                       | 12.52                           | 603.35                           | 11.00                           | 602.19                           | 1982           | BRK                   | 20.0                 | 4.0                               |
| MW173        |      | 15028827.26     | 1344123.204    | 615.56              | 612.56                 | 2.8                          | 11.8                            | 15.2                       | 12.25                           | 603.31                           | 12.00                           | 600.56                           | 1982           | OVB                   | 9.0                  | 3.6                               |
| MW174        |      | 15028974.94     | 1344649.467    | 615.32              | 612.40                 | 3.5                          | 14.5                            | 18.1                       | 12.03                           | 603.29                           | 15.00                           | 597.40                           | 1982           | OVB                   | 11.0                 | 3.6                               |
| MW175        |      | 15029420.69     | 1343046.596    | 634.45              | 630.96                 | 3.7                          | 19.7                            | 23.2                       | 15.14                           | 619.31                           | 20.00                           | 610.96                           | 1982           | OVB                   | 16.0                 | 3.6                               |
| MW176        |      | 15030320.57     | 1343491.565    | 646.77              | 643.49                 | 4.8                          | 20.8                            | 23.6                       | 24.42                           | 622.35                           | 20.80                           | 622.69                           | 1982           | OVB                   | 16.0                 | 3.6                               |
| MW177        |      | 15028773.31     | 1343380.183    | 616.29              | 613.84                 | 11.8                         | 31.0                            | 33.4                       | 7.99                            | 608.30                           | 6.50                            | 607.34                           | 1983           | BRK                   | 19.2                 | 3.0                               |
| MW178        |      | 15030330.01     | 1343512.024    | 643.83              | 640.39                 | 27.3                         | 46.5                            | 50.1                       | 28.01                           | 615.82                           | 20.00                           | 620.39                           | 1983           | BRK                   | 19.2                 | 3.0                               |
| MW400        |      | 15030872.22     | 1344840.211    | 655.17              | 652.56                 | 16.2                         | 26.2                            | 28.6                       | NM                              | NM                               | 21.00                           | 631.56                           | 1991           | COMBO                 | 10.0                 | 4.0                               |
| MW401        |      | 15028228.22     | 1344007.476    | 611.96              | 610.20                 | 28.5                         | 43.5                            | 46.1                       | 10.46                           | 601.50                           | 16.00                           | 594.20                           | 1991           | BRK                   | 15.0                 | 4.0                               |
| WES1         |      | 15029404.21     | 1343978.508    | 623.13              | 621.43                 | 20.0                         | 40.0                            | 40.0                       | 16.76                           | 606.37                           | 20.00                           | 601.43                           | 1997           | BRK                   | 20.0                 | 4.0                               |
| WES2         |      | 15029874.92     | 1343699.213    | 637.69              | 635.98                 | 22.0                         | 42.0                            | 42.0                       | 26.11                           | 611.58                           | 22.00                           | 613.98                           | 1997           | BRK                   | 20.0                 | 4.0                               |
| WES3         |      | 15028686.71     | 1344093.581    | 611.69              | 610.33                 | 20.0                         | 40.0                            | 40.0                       | 4.63                            | 607.06                           | 20.00                           | 590.33                           | 1997           | BRK                   | 20.0                 | 4.0                               |
| MW610        |      | 15028213.06     | 1344005.102    | 612.63              | 609.62                 | 4.0                          | 14.0                            | 14.0                       | 11.22                           | 601.41                           | UNKNOWN                         | UNKNOWN                          | 1999           | OVB                   | 10.0                 | 4.0                               |
| MW611        |      | 15027976.15     | 1344327.569    | 620.45              | 617.83                 | 10.0                         | 20.0                            | 21.0                       | 14.01                           | 606.44                           | UNKNOWN                         | UNKNOWN                          | 1999           | OVB                   | 10.0                 | 4.0                               |
| MW132        | L2   | 15026868.16     | 1339653.570    | 612.30              | 609.84                 | 7.5                          | 27.5                            | 29.4                       | NM                              | NM                               | 18.00                           | 591.84                           | 1981           | COMBO                 | 20.0                 | 4.0                               |
| MW133        |      | 15026726.48     | 1338362.506    | 605.88              | 603.51                 | 7.2                          | 27.2                            | 28.7                       | NM                              | NM                               | 19.50                           | 584.01                           | 1981           | COMBO                 | 20.0                 | 4.0                               |
| MW134        |      | 15025646.63     | 1338233.841    | 613.30              | 609.70                 | 6.7                          | 26.7                            | 27.1                       | 6.82                            | 606.48                           | UNKNOWN                         | UNKNOWN                          | 1981           | OVB                   | 20.0                 | 4.0                               |
| MW135        |      | 15025761.10     | 1339631.781    | 637.35              | 634.18                 | 6.0                          | 26.0                            | 27.0                       | NM                              | NM                               | UNKNOWN                         | UNKNOWN                          | 1981           | OVB                   | 20.0                 | 4.0                               |
| MW404        |      | 15026798.76     | 1338548.502    | 605.88              | 604.09                 | 7.7                          | 17.7                            | 20.5                       | NM                              | NM                               | 12.00                           | 592.09                           | 1991           | COMBO                 | 10.0                 | 4.0                               |
| MW405        |      | 15027072.91     | 1338771.791    | 607.21              | 605.16                 | 10.8                         | 20.8                            | 23.5                       | NM                              | NM                               | 16.00                           | 589.16                           | 1991           | COMBO                 | 10.0                 | 4.0                               |
| MW406        |      | 15026560.78     | 1339282.341    | 623.13              | 620.72                 | 23.8                         | 33.8                            | 35.7                       | NM                              | NM                               | 29.00                           | 591.72                           | 1991           | COMBO                 | 10.0                 | 4.0                               |
| MW407        |      | 15026676.15     | 1339269.053    | 620.05              | 618.30                 | 20.5                         | 30.5                            | 33.9                       | NM                              | NM                               | 25.50                           | 592.80                           | 1991           | COMBO                 | 10.0                 | 4.0                               |
| MW501        |      | 15025985.85     | 1338411.03     | 617.05              | 614.72                 | 12.7                         | 22.7                            | NA                         | NM                              | NM                               | 25.00                           | 589.72                           | 1991           | OVB                   | 10.0                 | 4.0                               |
| MW620        |      | 15027048.61     | 1338602.438    | 605.07              | 602.41                 | 7.0                          | 17.0                            | 18.0                       | NM                              | NM                               | UNKNOWN                         | UNKNOWN                          | 1999           | OVB                   | 10.0                 | 4.0                               |
| MW621        |      | 15027058.70     | 1338599.038    | 604.96              | 602.41                 | 22.0                         | 32.0                            | 32.8                       | NM                              | NM                               | 20.00                           | 582.41                           | 1999           | BRK                   | 10.0                 | 4.0                               |
| MW810        |      | 15027142.71     | 1338476.770    | 604.58              | 601.91                 | 7.0                          | 17.3                            | 18.0                       | NM                              | NM                               | UNKNOWN                         | UNKNOWN                          | 2009           | OVB                   | 10.0                 | 4.0                               |
| MW1          | L3   | 15025237.01     | 1338193.456    | 630.63              | 628.68                 | 16.5                         | 26.5                            | 27.8                       | 16.77                           | 613.86                           | UNKNOWN                         | UNKNOWN                          | 1986           | OVB                   | 10.0                 | 2.0                               |
| MW136        |      | 15024523.06     | 1337305.702    | 602.70              | 600.8                  | 7.2                          | 27.2                            | NA                         | 8.22                            | 594.48                           | 11.00                           | 589.80                           | 1981           | COMBO                 | 20.0                 | 4.0                               |
| MW137        |      | 15024661.00     | 1338608.636    | 632.90              | 631.40                 | 7.0                          | 27.0                            | 28.7                       | 4.55                            | 628.35                           | UNKNOWN                         | UNKNOWN                          | 1981           | OVB                   | 20.0                 | 4.0                               |
| MW3          |      | 15025504.29     | 1337801.715    | 610.34              | 608.50                 | 9.0                          | 19.0                            | 20.9                       | 4.87                            | 605.47                           | 19.00                           | 589.50                           | 1986           | OVB                   | 10.0                 | 2.0                               |
| MW410        |      | 15025282.41     | 1337409.613    | 604.38              | NA                     | 8.0                          | 18.0                            | 20.3                       | 12.06                           | 592.32                           | UNKNOWN                         | UNKNOWN                          | 1993           | OVB                   | 10.0                 | 4.0                               |
| MW411        |      | 15024977.88     | 1337383.946    | 616.71              | NA                     | 13.0                         | 23.0                            | 25.1                       | 19.10                           | 597.61                           | 18.00                           | 594.54                           | 1991           | COMBO                 | 10.0                 | 4.0                               |
| MW412        |      | 15024596.02     | 1337101.399    | 599.14              | 597.41                 | 7.4                          | 17.4                            | 19.2                       | 6.48                            | 592.66                           | 3.00                            | 594.41                           | 1991           | BRK                   | 10.0                 | 4.0                               |

TABLE 2-3

Monitoring Well Information - LAP Area

2012 Semi-Annual Groundwater Monitoring Report

Joliet Army Ammunition Plant

Will County, Illinois

| Area/Well ID | Site | Northing (Feet) | Easting (Feet) | TOC Elevation (MSL) | Ground Elevation (MSL) | Depth to Top of Screen (BGS) | Depth to Bottom of Screen (BGS) | Total Borehole Depth (BGS) | Depth to Water April 2012 (TOC) | Water Elevation April 2012 (MSL) | Depth to Bedrock From Log (BGS) | Bedrock Elevation from Log (MSL) | Year Installed | Formation Designation | Screen Length (Feet) | Casing & Screen Diameter (Inches) |
|--------------|------|-----------------|----------------|---------------------|------------------------|------------------------------|---------------------------------|----------------------------|---------------------------------|----------------------------------|---------------------------------|----------------------------------|----------------|-----------------------|----------------------|-----------------------------------|
| MW630        | L3   | 15024770.15     | 1337013.674    | 595.06              | 592.23                 | 7.0                          | 12.0                            | 12.7                       | 6.73                            | 588.33                           | 4.00                            | 588.20                           | 1999           | BRK                   | 5.0                  | 4.0                               |
| MW631        |      | 15024764.63     | 1337010.736    | 595.09              | 592.23                 | 16.0                         | 26.0                            | 27.0                       | 4.76                            | 590.33                           | 4.00                            | 588.20                           | 1999           | BRK                   | 10.0                 | 4.0                               |
| MW632        |      | 15024828.58     | 1336912.350    | 606.25              | 603.75                 | 12.0                         | 27.2                            | 27.5                       | 15.89                           | 590.36                           | UNKNOWN                         | UNKNOWN                          | 2009           | BRK                   | 15.0                 | 4.0                               |
| MW633        |      | 15024474.50     | 1336978.448    | 600.37              | 597.90                 | 7.0                          | 17.0                            | 18.0                       | 8.89                            | 591.48                           | 5.00                            | 592.90                           | 1999           | BRK                   | 10.0                 | 4.0                               |
| H-7          | L14  | 15019448.58     | 1332662.795    | 584.62              | 581.45                 | 4.0                          | 14.0                            | 15.5                       | NM                              | NM                               | 12.00                           | 569.45                           | 1982           | OVB                   | 10.0                 | 2.0                               |
| H-8          |      | 15019409.64     | 1333457.292    | 591.40              | 588.14                 | 7.0                          | 22.0                            | 22.9                       | NM                              | NM                               | 20.00                           | 568.14                           | 1982           | OVB                   | 15.0                 | 2.0                               |
| MW140        |      | 15018819.68     | 1332901.750    | 584.59              | 581.68                 | 7.0                          | 27.0                            | 30.3                       | NM                              | NM                               | 22.00                           | 559.68                           | 1981           | COMBO                 | 20.0                 | 4.0                               |
| MW508        |      | 15019632.37     | 1333106.169    | 587.44              | 585.34                 | 10.0                         | 20.0                            | 22.9                       | NM                              | NM                               | UNKNOWN                         | UNKNOWN                          | 1993           | OVB                   | 10.0                 | 4.0                               |
| MW511        |      | 15019645.92     | 1333029.631    | 587.79              | 584.98                 | 4.0                          | 14.0                            | 17.0                       | NM                              | NM                               | 16.00                           | 568.98                           | 1997           | OVB                   | 10.0                 | 4.0                               |
| MW512        |      | 15019541.13     | 1333111.131    | 588.04              | 585.98                 | 5.0                          | 15.0                            | 18.2                       | NM                              | NM                               | 16.00                           | 569.98                           | 1997           | OVB                   | 10.0                 | 4.0                               |
| MW600        |      | 15019920.13     | 1332928.643    | 587.22              | 584.75                 | 6.0                          | 11.0                            | 11.0                       | NM                              | NM                               | 11.00                           | 573.75                           | 1998           | OVB                   | 5.0                  | 2.0                               |
| MW601        |      | 15019196.31     | 1333121.302    | 586.72              | 584.29                 | 9.0                          | 19.0                            | 20.0                       | NM                              | NM                               | 19.60                           | 564.69                           | 1998           | OVB                   | 10.0                 | 2.0                               |
| MW602        |      | 15019432.73     | 1332663.469    | 583.83              | 581.22                 | 21.0                         | 31.0                            | 31.0                       | NM                              | NM                               | 12.00                           | 569.20                           | 1999           | BRK                   | 10.0                 | 4.0                               |
| MW603        |      | 15019323.75     | 1332379.579    | 580.77              | 578.27                 | 6.0                          | 16.0                            | 16.0                       | NM                              | NM                               | 13.00                           | 565.30                           | 1999           | OVB                   | 10.0                 | 4.0                               |
| MW604        |      | 15019335.87     | 1332379.437    | 581.12              | 578.27                 | 20.0                         | 30.0                            | 31.0                       | NM                              | NM                               | 13.00                           | 565.30                           | 1999           | BRK                   | 10.0                 | 4.0                               |

General Notes

Water levels measured between April 10 and 13, 2012.

Coordinates are Universal Transverse Mercator (UTM), Zone 16 East, North American Datum 1983 (NAD83)

UNKOWN = indicate data not presented on borelogs or provided in RI/FS documentation.

NM = Not Applicable, water levels not measured.

BRK = Bedrock

OVB = Overburden

COMBO = Combination Overburden and Bedrock Well

MSL = Feet relative to mean seal level

BGS = Feet below ground surface

ID = identification

TOC = Top of Casing

**TABLE 2-4**

**Surface Water Elevations  
2012 Semi-Annual Groundwater Monitoring Report  
Joliet Army Ammunition Plant  
Will County, Illinois**

| Site | Surface Water Location | Surface Water Elevation |                       |
|------|------------------------|-------------------------|-----------------------|
|      |                        | Date                    | ft (MSL)              |
| L1   | SW550                  | 4/10/2012               | 603.85                |
| L3   | SW557                  | 4/10/2012               | 587.96                |
|      | SW558                  | 4/10/2012               | 595.56                |
|      | SW777                  | 4/10/2012               | 588.07 <sup>(1)</sup> |
|      | SW004                  | 4/10/2012               | 589.43                |
| M1   | SW709                  | 4/13/2012               | 532.71                |

General Note:

MSL = Mean Sea Level

Footnote:

- (1) Surface water elevation not used in production of water table map due to elevation measured being higher than upstream location.

Table 3-1

Summary of Analytical Results - Explosives  
2012 Semi-Annual Groundwater Monitoring Report  
Joliet Army Ammunition Plant  
Will County, Illinois

|                       | Compound                            |           | 1,3-DNB |       | 2,4-DNT |       | 2,6-DNT |       | 2-A-4,6-DNT |       | 4-A-2,6-DNT |       | HMX    | NB    | 2-NT   | 3-NT  | 4-NT   | RDX   | Tetryl | 1,3,5-TNB | 2,4,6-TNT |       |        |       |
|-----------------------|-------------------------------------|-----------|---------|-------|---------|-------|---------|-------|-------------|-------|-------------|-------|--------|-------|--------|-------|--------|-------|--------|-----------|-----------|-------|--------|-------|
|                       | Units                               |           | µg/L    |       | µg/L    |       | µg/L    |       | µg/L        |       | µg/L        |       | µg/L   | µg/L  | µg/L   | µg/L  | µg/L   | µg/L  | µg/L   | µg/L      | µg/L      |       |        |       |
|                       | Project Action Limit <sup>(1)</sup> |           | 10      |       | 0.42    |       | 0.42    |       | NS          |       | NS          |       | 5100   | 51    | 5100   | NS    | NS     | 2.6   | 200    | 5.1       | 9.5       |       |        |       |
|                       | Surface Water RG                    |           | 4       |       | 330     |       | 150     |       | NS          |       | NS          |       | 260    | 8000  | 62     | NS    | NS     | 500   | 700    | 15        | 75        |       |        |       |
| Site                  | Well                                | Date      | Result  | LF/VF | Result  | LF/VF | Result  | LF/VF | Result      | LF/VF | Result      | LF/VF | Result | LF/VF | Result | LF/VF | Result | LF/VF | Result | LF/VF     | Result    | LF/VF | Result | LF/VF |
| L1                    | In-Plume                            |           |         |       |         |       |         |       |             |       |             |       |        |       |        |       |        |       |        |           |           |       |        |       |
|                       | MW131                               | 4/12/2012 | 5.4     | /J    | <3.1    |       | <3.1    |       | 65          |       | 70          | /J    | <3.1   | <1.6  | <3.1   | <3.1  | <3.1   | <1.6  | <3.9   | <1.6      |           | 2200  |        |       |
|                       | WES1                                | 4/12/2012 | <1.6    |       | <3.1    |       | <3.1    |       | 13          |       | 21          | /J    | <3.1   | 3.9   | <3.1   | <3.1  | <3.1   | <1.6  | <3.9   | 40        | /J        | 38    |        |       |
|                       | MW173                               | 4/11/2012 | <0.16   |       | <0.31   |       | <0.31   |       | 4.8         |       | 5.4         | /J    | <0.16  | <0.31 | <0.31  | <0.31 | <0.31  | 10    | <0.39  | <0.16     |           | 12    |        |       |
|                       | Early Warning                       |           |         |       |         |       |         |       |             |       |             |       |        |       |        |       |        |       |        |           |           |       |        |       |
|                       | MW174                               | 4/11/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | <0.31  | <0.16 | <0.31  | <0.31 | <0.31  | <0.16 | <0.39  | <0.16     |           | <0.16 |        |       |
|                       | WES3                                | 4/11/2012 | <0.16   |       | <0.31   |       | <0.31   |       | 0.67        |       | 1           |       | <0.31  | <0.16 | <0.31  | <0.31 | <0.31  | 0.74  | <0.39  | 0.2       |           | 1.2   |        |       |
|                       | Compliance                          |           |         |       |         |       |         |       |             |       |             |       |        |       |        |       |        |       |        |           |           |       |        |       |
|                       | SW550                               | 4/12/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | <0.31  | <0.16 | <0.31  | <0.31 | <0.31  | <0.16 | <0.39  | <0.16     |           | <0.16 |        |       |
| L3                    | Upgradient                          |           |         |       |         |       |         |       |             |       |             |       |        |       |        |       |        |       |        |           |           |       |        |       |
|                       | SW004                               | 4/12/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | <0.31  | <0.16 | <0.31  | <0.31 | <0.31  | <0.16 | <0.39  | <0.16     |           | <0.16 |        |       |
|                       | In-Plume/Downgradient               |           |         |       |         |       |         |       |             |       |             |       |        |       |        |       |        |       |        |           |           |       |        |       |
|                       | MW410                               | 4/11/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | <0.31  | <0.16 | <0.31  | <0.31 | <0.31  | <0.16 | <0.39  | <0.16     |           | <0.16 |        |       |
|                       | MW412                               | 4/11/2012 | <0.16   |       | <0.31   |       | <0.31   |       | 0.89        |       | 1.7         |       | 28     | /J    | 0.24   | <0.31 | <0.31  | <0.31 | 120    | <0.39     | 0.11      | F/J   | <0.16  |       |
|                       | Early Warning/Downgradient          |           |         |       |         |       |         |       |             |       |             |       |        |       |        |       |        |       |        |           |           |       |        |       |
|                       | MW630                               | 4/11/2012 | <0.16   |       | <0.31   |       | <0.31   |       | 0.077       | F/J   | 0.18        | F/J   | 4.7    | /J    | <0.16  | <0.31 | <0.31  | <0.31 | 8.7    | <0.39     | <0.16     |       | <0.16  |       |
|                       | MW630(DUP)                          | 4/11/2012 | <0.16   |       | <0.31   |       | <0.31   |       | 0.072       | F/J   | 0.15        | F/J   | 4.7    | /J    | <0.16  | <0.31 | <0.31  | <0.31 | 8.7    | <0.39     | <0.16     |       | <0.16  |       |
|                       | MW631                               | 4/11/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | <0.31  | <0.16 | <0.31  | <0.31 | <0.31  | <0.16 | <0.39  | <0.16     |           | <0.16 |        |       |
|                       | MW633                               | 4/11/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | 2      | /J    | <0.16  | <0.31 | <0.31  | <0.31 | 6.7    | <0.39     | <0.16     |       | <0.16  |       |
|                       | Compliance/Downgradient             |           |         |       |         |       |         |       |             |       |             |       |        |       |        |       |        |       |        |           |           |       |        |       |
|                       | SW777                               | 4/11/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | <0.31  | <0.16 | <0.31  | <0.31 | <0.31  | 0.25  | <0.39  | <0.16     |           | <0.16 |        |       |
|                       | Downgradient                        |           |         |       |         |       |         |       |             |       |             |       |        |       |        |       |        |       |        |           |           |       |        |       |
|                       | SW557                               | 4/10/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | 1.1    | /J    | <0.16  | <0.31 | <0.31  | <0.31 | 3.2    | <0.39     | <0.16     |       | <0.16  |       |
|                       | SW558                               | 4/10/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | <0.31  | <0.16 | <0.31  | <0.31 | <0.31  | <0.16 | <0.39  | <0.16     |           | <0.16 |        |       |
| MFG<br>(M6)           | In-Plume                            |           |         |       |         |       |         |       |             |       |             |       |        |       |        |       |        |       |        |           |           |       |        |       |
|                       | MW212R                              | 4/15/2012 | 1.1     | F/    | 620     |       | 260     |       | 64          | /J    | 51          | /J    | <3.1   | 1.9   | 4100   | <3.1  | 2100   | <1.6  | <3.9   | <1.6      |           | 39    |        |       |
|                       | MW652                               | 4/14/2012 | 9.5     | F/    | 8400    |       | 3300    |       | 360         |       | 380         | /J    | <31    | <16   | 44000  | <31   | 28000  | <16   | <39    | <16       |           | 1600  |        |       |
|                       | MW652(DUP)                          | 4/14/2012 | 7.9     | F/    | 6800    |       | 2700    |       | 320         |       | 320         | /J    | <31    | <16   | 35000  | <31   | 22000  | /J    | <16    | <39       | <16       |       | 1300   |       |
| (M6)                  | Early Warning                       |           |         |       |         |       |         |       |             |       |             |       |        |       |        |       |        |       |        |           |           |       |        |       |
|                       | MW123R                              | 4/14/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | <0.31  | <0.16 | <0.31  | <0.31 | <0.31  | <0.16 | <0.39  | <0.16     |           | <0.16 |        |       |
|                       | MW123R(DUP)                         | 4/14/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | <0.31  | <0.16 | <0.31  | <0.31 | <0.31  | <0.16 | <0.39  | <0.16     |           | <0.16 |        |       |
|                       | MW162R                              | 4/14/2012 | <0.16   |       | 0.27    | F/J   | 0.14    | F/    | <0.31       |       | <0.31       |       | <0.31  | <0.16 | 0.7    | <0.31 | <0.31  | <0.16 | <0.39  | <0.16     |           | <0.16 |        |       |
|                       | MW313                               | 4/15/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | <0.31  | <0.16 | <0.31  | <0.31 | <0.31  | <0.16 | <0.39  | <0.16     |           | <0.16 |        |       |
|                       | MW318                               | 4/14/2012 | <0.32   |       | 0.21    | F/J   | 0.45    | F/J   | <0.62       |       | <0.62       |       | <0.62  | <0.32 | <0.62  | <0.62 | <0.62  | <0.32 | <0.78  | <0.32     |           | <0.32 |        |       |
|                       | MW319                               | 4/14/2012 | <0.32   |       | <0.62   |       | <0.62   |       | <0.62       |       | <0.62       |       | <0.62  | <0.32 | <0.62  | <0.62 | <0.62  | <0.32 | <0.78  | <0.32     |           | 0.29  | F/J    |       |
|                       | MW654                               | 4/15/2012 | <0.16   |       | 1.7     |       | 0.97    |       | 0.7         |       | 2.2         |       | <0.31  | <0.16 | 18     | 0.23  | F/J    | 11    | 0.31   | /J        | <0.39     | <0.16 | 0.18   | /J    |
| (M7)                  | MW124R                              | 4/14/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | <0.16  | <0.31 | <0.31  | <0.31 | <0.16  | <0.39 | <0.16  |           | <0.16     |       |        |       |
| (M6)<br>(Other Areas) | Compliance                          |           |         |       |         |       |         |       |             |       |             |       |        |       |        |       |        |       |        |           |           |       |        |       |
|                       | MW117                               | 4/13/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | <0.31  | <0.16 | <0.31  | U/UJ  | <0.31  | <0.31 | <0.16  | <0.39     | <0.16     |       | <0.16  |       |
|                       | MW118                               | 4/13/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | <0.31  | <0.16 | <0.31  | U/UJ  | <0.31  | <0.31 | <0.16  | <0.39     | <0.16     |       | <0.16  |       |
|                       | MW119                               | 4/13/2012 | <0.16   |       | <0.31   |       | <0.31   |       | <0.31       |       | <0.31       |       | <0.31  | <0.16 | <0.31  | U/UJ  | <0.31  | <0.31 | <0.16  | <0.39     | <0.16     |       | <0.16  |       |

Table 3-1

Summary of Analytical Results - Explosives  
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Joliet Army Ammunition Plant  
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|       | Compound                            |           | 1,3-DNB | 2,4-DNT | 2,6-DNT | 2-A-4,6-DNT | 4-A-2,6-DNT | HMX   | NB     | 2-NT  | 3-NT   | 4-NT  | RDX    | Tetryl | 1,3,5-TNB | 2,4,6-TNT |        |       |        |       |        |        |       |       |       |     |
|-------|-------------------------------------|-----------|---------|---------|---------|-------------|-------------|-------|--------|-------|--------|-------|--------|--------|-----------|-----------|--------|-------|--------|-------|--------|--------|-------|-------|-------|-----|
|       | Units                               |           | µg/L    | µg/L    | µg/L    | µg/L        | µg/L        | µg/L  | µg/L   | µg/L  | µg/L   | µg/L  | µg/L   | µg/L   | µg/L      | µg/L      |        |       |        |       |        |        |       |       |       |     |
|       | Project Action Limit <sup>(1)</sup> |           | 10      | 0.42    | 0.42    | NS          | NS          | 5100  | 51     | 5100  | NS     | NS    | 2.6    | 200    | 5.1       | 9.5       |        |       |        |       |        |        |       |       |       |     |
|       | Surface Water RG                    |           | 4       | 330     | 150     | NS          | NS          | 260   | 8000   | 62    | NS     | NS    | 500    | 700    | 15        | 75        |        |       |        |       |        |        |       |       |       |     |
| Site  | Well                                | Date      | Result  | LF/VF   | Result  | LF/VF       | Result      | LF/VF | Result | LF/VF | Result | LF/VF | Result | LF/VF  | Result    | LF/VF     | Result | LF/VF | Result | LF/VF | Result | LF/VF  |       |       |       |     |
| M11   | Upgradient                          |           |         |         |         |             |             |       |        |       |        |       |        |        |           |           |        |       |        |       |        |        |       |       |       |     |
|       | MW802                               | 4/16/2012 | <0.16   |         | <0.31   |             | <0.31       |       | <0.31  |       | <0.16  |       | <0.31  |        | <0.31     |           | <0.16  |       | <0.39  |       | <0.16  | U / UJ |       |       |       |     |
|       | Downgradient                        |           |         |         |         |             |             |       |        |       |        |       |        |        |           |           |        |       |        |       |        |        |       |       |       |     |
|       | MW335                               | 4/16/2012 | <0.16   |         | <0.31   |             | <0.31       |       | <0.31  |       | <0.16  |       | <0.31  |        | <0.31     |           | <0.16  |       | <0.39  |       | <0.16  | U / UJ |       |       |       |     |
|       | MW336                               | 4/16/2012 | <0.16   |         | <0.31   |             | <0.31       |       | <0.31  |       | <0.16  |       | <0.31  |        | <0.31     |           | <0.16  |       | <0.39  |       | <0.16  | U / UJ |       |       |       |     |
| MW805 | 4/16/2012                           | <0.16     |         | <0.31   |         | <0.31       |             | <0.31 |        | <0.16 |        | <0.31 |        | <0.31  |           | <0.16     |        | <0.39 |        | <0.16 | U / UJ |        |       |       |       |     |
| M13   | Upgradient                          |           |         |         |         |             |             |       |        |       |        |       |        |        |           |           |        |       |        |       |        |        |       |       |       |     |
|       | MW806                               | 2/29/2012 | <0.16   |         | <0.31   |             | <0.31       |       | <0.31  |       | <0.16  |       | <0.31  |        | <0.31     |           | <0.16  |       | <0.39  |       | <0.16  |        |       |       |       |     |
|       | MW806                               | 4/16/2012 | <0.16   |         | <0.31   |             | <0.31       |       | <0.31  |       | <0.16  |       | <0.31  |        | <0.31     |           | <0.16  |       | <0.39  |       | <0.16  |        |       |       |       |     |
|       | MW807                               | 2/29/2012 | <0.16   |         | <0.31   |             | <0.31       |       | <0.31  |       | <0.16  |       | <0.31  |        | <0.31     |           | <0.16  |       | <0.39  |       | <0.16  |        |       |       |       |     |
|       | MW807                               | 4/16/2012 | <0.16   |         | <0.31   |             | <0.31       |       | <0.31  |       | <0.16  |       | <0.31  |        | <0.31     |           | <0.16  |       | <0.39  |       | <0.16  | U / UJ |       |       |       |     |
|       | Downgradient                        |           |         |         |         |             |             |       |        |       |        |       |        |        |           |           |        |       |        |       |        |        |       |       |       |     |
|       | AEHA14R                             | 3/1/2012  | <0.16   |         | <0.31   |             | <0.31       | 0.79  | 1.1    | <0.31 |        | <0.16 |        | <0.31  |           | <0.31     |        | <0.16 |        | <0.39 |        | <0.16  |       |       |       |     |
|       | AEHA15                              | 3/1/2012  | <0.16   |         | <0.31   |             | <0.31       |       | <0.31  |       | <0.16  |       | <0.31  |        | <0.31     |           | <0.16  |       | <0.39  |       | <0.16  |        | <0.16 |       |       |     |
|       | Downgradient                        |           |         |         |         |             |             |       |        |       |        |       |        |        |           |           |        |       |        |       |        |        |       |       |       |     |
|       | MW126R                              | 2/29/2012 | <0.16   |         | <0.31   |             | <0.31       |       | <0.31  |       | <0.16  |       | <0.31  |        | <0.31     |           | <0.16  |       | <0.39  |       | <0.16  |        | <0.16 |       |       |     |
|       | MW126R                              | 4/16/2012 | <0.16   |         | <0.31   |             | <0.31       |       | <0.31  |       | <0.16  |       | 0.35   | <0.31  | 0.3       | F /       | <0.16  |       | <0.39  |       | <0.16  |        | <0.16 |       |       |     |
|       | MW362                               | 2/29/2012 | <0.16   |         | 1.5     |             | <0.31       | 0.83  | 0.78   | <0.31 |        | <0.16 |        | <0.31  |           | <0.31     |        | <0.16 |        | <0.39 |        | <0.16  |       |       |       |     |
|       | MW362                               | 4/16/2012 | <0.16   |         | 4.9     |             | <0.31       | 1.2   | 1.1    | <0.31 |        | <0.16 |        | 0.24   | F / J     | <0.31     |        | <0.31 | U / UJ | <0.16 |        | <0.39  |       | <0.16 | 0.073 | F / |
|       | MW362(DUP)                          | 4/16/2012 | <0.16   |         | 5.4     |             | <0.31       | 1.2   | 1      | <0.31 |        | <0.16 |        | 2      | / J       | 0.19      | F /    | 1.9   | / J    | <0.16 |        | <0.39  |       | <0.16 | 0.097 | F / |
|       | MW808                               | 2/29/2012 | <0.16   |         | <0.31   |             | <0.31       |       | <0.31  |       | <0.16  |       | <0.31  |        | <0.31     |           | <0.16  |       | <0.39  |       | <0.16  |        | <0.16 |       | <0.16 |     |
|       | MW808                               | 4/16/2012 | <0.16   |         | <0.31   |             | <0.31       |       | <0.31  |       | <0.16  |       | <0.31  |        | <0.31     |           | <0.16  |       | <0.39  |       | <0.16  |        | <0.16 |       | <0.16 |     |
|       | MW809                               | 2/29/2012 | <0.16   |         | <0.31   |             | <0.31       |       | <0.31  |       | <0.16  |       | <0.31  |        | <0.31     |           | <0.16  |       | <0.39  |       | <0.16  |        | <0.16 |       | <0.16 |     |
|       | MW809(DUP)                          | 2/29/2012 | <0.16   |         | <0.31   |             | <0.31       |       | <0.31  |       | <0.16  |       | <0.31  |        | <0.31     |           | <0.16  |       | <0.39  |       | <0.16  |        | <0.16 |       | <0.16 |     |
|       | MW809                               | 4/16/2012 | <0.16   |         | <0.31   |             | <0.31       |       | <0.31  |       | <0.16  |       | <0.31  |        | <0.31     |           | <0.16  |       | <0.39  |       | <0.16  |        | <0.16 |       | <0.16 |     |

Footnotes:  
(1) Project Action Limits (Remedial Goal{RG}) obtained from Worksheet #15 of Appendix B (QAPP) of theLong Term Monitoring Plan (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:

Only data collected in 2012 are shown.  
< = Result shows laboratory Method Reporting Limit for non-detected results  
µg/L = microgram per liter  
1,3,5-TNB = 1,3,5-Trinitrobenzene  
1,3-DNB = 1,3-Dinitrobenzene  
2,4,6-TNT = 2,4,6-Trinitrotoluene  
2,4-DNT = 2,4-Dinitrotoluene  
2,6-DNT = 2,6-Dinitrotoluene  
2-A-4,6-DNT = 2-amino-4,6-Dinitrotoluene  
2-NT = 2-Nitrotoluene  
3-NT = 3 Nitrotoluene  
4-A-2,6-DNT = 4-amino-2,6-Dinitrotoluene  
4-NT = 4-Nitrotoluene

Bolded result indicates Project Action Limit (RG) exceedance  
DUP = duplicate  
F = Concentration below the reported detection limit  
HMX = High melting explosive  
J = Estimated concentration  
LF/VF = Lab Flag/Validation Flag  
NB = Nitrobenzene  
NJ = presumptive evidence that compound concentration is estimated  
NS = No standard  
RDX = Royal demolition explosive  
U = Not detected  
UJ = Not detected, estimated detection limit



Table 3-3

**Summary of Analytical Results - Indicator Parameters**  
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**Will County, Illinois**

|             | Compound                            |           | Nitrate |        | Sulfate       |       |
|-------------|-------------------------------------|-----------|---------|--------|---------------|-------|
|             | Units                               |           | mg/L    |        | mg/L          |       |
|             | Project Action Limit <sup>(1)</sup> |           | 10      |        | 400           |       |
|             | Surface Water RG                    |           | NS      |        | NS            |       |
| Site        | Well                                | Date      | Result  | LF/VF  | Result        | LF/VF |
| M1          | <i>In-Plume</i>                     |           |         |        |               |       |
|             | MW107                               | 4/12/2012 | NA      |        | <b>26,000</b> |       |
|             | MW231                               | 4/12/2012 | NA      |        | <b>35,000</b> |       |
|             | MW640                               | 4/12/2012 | NA      |        | <b>5,200</b>  |       |
|             | MW641                               | 4/12/2012 | NA      |        | <b>640</b>    |       |
|             | MW641(DUP)                          | 4/12/2012 | NA      |        | <b>640</b>    |       |
|             | MW642                               | 4/12/2012 | NA      |        | <b>420</b>    |       |
|             | MW642(DUP)                          | 4/12/2012 | NA      |        | <b>420</b>    |       |
|             | <i>Early Warning</i>                |           |         |        |               |       |
|             | MW643                               | 4/13/2012 | NA      |        | 58            |       |
|             | MW644                               | 4/13/2012 | NA      |        | 160           |       |
|             | <i>Compliance</i>                   |           |         |        |               |       |
|             | MW645                               | 4/13/2012 | NA      |        | 67            |       |
|             | MW646                               | 4/13/2012 | NA      |        | 110           |       |
|             | MW648                               | 4/12/2012 | NA      |        | 34            |       |
|             | MW649                               | 4/13/2012 | NA      |        | 64            |       |
|             | SW709                               | 4/13/2012 | NA      |        | 60            |       |
| MFG<br>(M9) | <i>In-Plume</i>                     |           |         |        |               |       |
|             | MW330                               | 4/17/2012 | NA      |        | <b>430</b>    |       |
| M11         | <i>Upgradient</i>                   |           |         |        |               |       |
|             | MW802                               | 4/16/2012 | 0.11    |        | 85            |       |
|             | <i>Downgradient</i>                 |           |         |        |               |       |
|             | MW335                               | 4/16/2012 | 0.31    |        | <b>660</b>    |       |
|             | MW336                               | 4/16/2012 | 0.12    |        | <b>410</b>    |       |
| M13         | MW805                               | 4/16/2012 | 0.22    |        | <b>470</b>    |       |
|             | <i>Upgradient</i>                   |           |         |        |               |       |
|             | MW806                               | 2/29/2012 | 0.39    |        | 79            |       |
|             | MW806                               | 4/16/2012 | 0.39    | / J    | 80            |       |
|             | MW807                               | 2/29/2012 | <1.0    |        | 230           |       |
|             | MW807                               | 4/16/2012 | <1.0    | U / UJ | 230           |       |
|             | <i>Downgradient</i>                 |           |         |        |               |       |
|             | AEHA14R                             | 3/1/2012  | 1.7     |        | 140           |       |
|             | AEHA15                              | 3/1/2012  | 0.13    |        | 12            |       |
|             | MW126R                              | 2/29/2012 | 0.12    |        | 53            |       |
|             | MW126R                              | 4/16/2012 | 0.13    |        | 52            |       |
|             | MW362                               | 2/29/2012 | <1.0    |        | 280           |       |
|             | MW362                               | 4/16/2012 | <1.0    |        | 270           |       |
|             | MW362(DUP)                          | 4/16/2012 | <1.0    | U / UJ | 270           |       |
|             | MW808                               | 2/29/2012 | <0.10   |        | 99            |       |
|             | MW808                               | 4/16/2012 | <0.10   |        | 88            |       |
|             | MW809                               | 2/29/2012 | <0.10   |        | 5.9           |       |
|             | MW809(DUP)                          | 2/29/2012 | <0.10   |        | 5.9           |       |
|             | MW809                               | 4/16/2012 | 0.13    | / J    | 5.4           |       |

**Footnotes:**

(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

**General Notes:**

mg/L = milligrams per liter  
 < = Result shows laboratory Method Reporting Limit for non-detected results  
 Bolded result indicates Project Action Limit (RG) exceedance  
 DUP = duplicate  
 F = Concentration below the reported detection limit  
 J = Estimated concentration  
 LF/VF = Lab Flag/Validation Flag  
 NA = not analyzed  
 NS = No standard  
 R = Rejected data, unusable  
 U = Not detected  
 UJ = Not detected, estimated detection limit

Table 3-4

Summary of Analytical Results - Volatile Organic Compounds  
2012 Semi-Annual Groundwater Monitoring Report  
Joliet Army Ammunition Plant  
Will County, Illinois

| Site       | Compound                |           | Acetone |        | Benzene |        | Carbon disulfide |        | Chlorobenzene |        | Chloromethane |        | 1,1-DCA |        | 1,2-DCA |        | cis-1,2-DCE |        | Ethyl Benzene |        | MethCl |        | MEK    |        | Naphthalene |        | PCE   |        | Toluene |        | 1,1,1-TCA |        | TCE   |        | VC    |        | Xylenes (total) |  |
|------------|-------------------------|-----------|---------|--------|---------|--------|------------------|--------|---------------|--------|---------------|--------|---------|--------|---------|--------|-------------|--------|---------------|--------|--------|--------|--------|--------|-------------|--------|-------|--------|---------|--------|-----------|--------|-------|--------|-------|--------|-----------------|--|
|            | Units                   |           | µg/L    |        | µg/L    |        | µg/L             |        | µg/L          |        | µg/L          |        | µg/L    |        | µg/L    |        | µg/L        |        | µg/L          |        | µg/L   |        | µg/L   |        | µg/L        |        | µg/L  |        | µg/L    |        | µg/L      |        | µg/L  |        | µg/L  |        | µg/L            |  |
|            | Project Action Limit(1) |           | NS      |        | 25      |        | NS               |        | 500           |        | NS            |        | 3500    |        | 25      |        | 200         |        | 1,000         |        | NS     |        | NS     |        | NS          |        | 25    |        | 2,500   |        | 1,000     |        | 25    |        | 25    |        | 10,000          |  |
| Well       | Date                    | Result    | LF/VF   | Result | LF/VF   | Result | LF/VF            | Result | LF/VF         | Result | LF/VF         | Result | LF/VF   | Result | LF/VF   | Result | LF/VF       | Result | LF/VF         | Result | LF/VF  | Result | LF/VF  | Result | LF/VF       | Result | LF/VF | Result | LF/VF   | Result | LF/VF     | Result | LF/VF | Result | LF/VF | Result | LF/VF           |  |
| M11        | Upgradient              |           |         |        |         |        |                  |        |               |        |               |        |         |        |         |        |             |        |               |        |        |        |        |        |             |        |       |        |         |        |           |        |       |        |       |        |                 |  |
|            | MW802                   | 4/16/2012 | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          |        | <1.0    |        | <1.0    |        | <1.0        |        | <3.0          |        | <5.0   |        | <1.0   |        | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  |        | <1.0  |        | <1.0            |  |
|            | Downgradient            |           |         |        |         |        |                  |        |               |        |               |        |         |        |         |        |             |        |               |        |        |        |        |        |             |        |       |        |         |        |           |        |       |        |       |        |                 |  |
|            | MW335                   | 4/16/2012 | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          |        | <1.0    |        | <1.0    |        | <1.0        |        | <3.0          |        | <5.0   |        | <1.0   |        | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  |        | <1.0  |        | <1.0            |  |
|            | MW336                   | 4/16/2012 | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          |        | <1.0    |        | <1.0    |        | <1.0        |        | <3.0          |        | <5.0   |        | <1.0   |        | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  |        | <1.0  |        | <1.0            |  |
| MW805      | 4/16/2012               | <5.0      |         | <1.0   |         | <5.0   |                  | <1.0   |               | <1.0   |               | <1.0   |         | <1.0   |         | <1.0   |             | <3.0   |               | <5.0   |        | <1.0   |        | <1.0   |             | <1.0   |       | <1.0   |         | <1.0   |           | <1.0   |       | <1.0   |       | <1.0   |                 |  |
| M13        | Upgradient              |           |         |        |         |        |                  |        |               |        |               |        |         |        |         |        |             |        |               |        |        |        |        |        |             |        |       |        |         |        |           |        |       |        |       |        |                 |  |
|            | MW806                   | 2/29/2012 | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          | U / UJ | <1.0    |        | <1.0    |        | <1.0        |        | <1.0          |        | <3.0   |        | <5.0   | U / UJ | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  |        | <1.0  |        | <1.0            |  |
|            | MW806                   | 4/16/2012 | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          |        | <1.0    |        | <1.0    |        | <1.0        |        | <3.0          |        | <5.0   |        | <1.0   |        | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  |        | <1.0  |        | <1.0            |  |
|            | MW807                   | 2/29/2012 | <5.0    |        | <1.0    |        | 2.4              | F /    | <1.0          |        | <1.0          | U / UJ | 1.4     |        | <1.0    |        | 0.79        | F /    | <1.0          |        | <3.0   |        | <5.0   | U / UJ | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  |        | <1.0  |        | <1.0            |  |
|            | MW807                   | 4/16/2012 | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          |        | <1.0    |        | <1.0    |        | <1.0        |        | <3.0          |        | <5.0   |        | <1.0   |        | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  |        | <1.0  |        | <1.0            |  |
|            | Downgradient            |           |         |        |         |        |                  |        |               |        |               |        |         |        |         |        |             |        |               |        |        |        |        |        |             |        |       |        |         |        |           |        |       |        |       |        |                 |  |
|            | AEHA14R                 | 3/1/2012  | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          | U / UJ | <1.0    |        | <1.0    |        | <1.0        |        | <1.0          |        | <3.0   |        | <5.0   |        | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  | U / UJ | <1.0  |        | <1.0            |  |
|            | AEHA15                  | 3/1/2012  | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          | U / UJ | <1.0    |        | <1.0    |        | <1.0        |        | <1.0          |        | <3.0   |        | <5.0   |        | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  | U / UJ | <1.0  |        | <1.0            |  |
|            | MW126R                  | 2/29/2012 | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          | U / UJ | <1.0    |        | <1.0    |        | <1.0        |        | <1.0          |        | <3.0   |        | <5.0   | U / UJ | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  |        | <1.0  |        | <1.0            |  |
|            | MW126R                  | 4/16/2012 | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          |        | <1.0    |        | <1.0    |        | <1.0        |        | <1.0          |        | <3.0   |        | <5.0   |        | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | 0.23  | F /    | <1.0  |        | <1.0            |  |
|            | MW362                   | 2/29/2012 | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          | U / UJ | <1.0    |        | <1.0    |        | <1.0        |        | <1.0          |        | <3.0   |        | <5.0   | U / UJ | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  |        | <1.0  |        | <1.0            |  |
|            | MW362                   | 4/16/2012 | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          |        | <1.0    |        | <1.0    |        | <1.0        |        | <1.0          |        | <3.0   |        | <5.0   |        | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  |        | <1.0  |        | <1.0            |  |
|            | MW362(DUP)              | 4/16/2012 | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          |        | <1.0    |        | <1.0    |        | <1.0        |        | <1.0          |        | <3.0   |        | <5.0   |        | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  |        | <1.0  |        | <1.0            |  |
|            | Downgradient            |           |         |        |         |        |                  |        |               |        |               |        |         |        |         |        |             |        |               |        |        |        |        |        |             |        |       |        |         |        |           |        |       |        |       |        |                 |  |
|            | MW808                   | 2/29/2012 | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          | U / UJ | <1.0    |        | <1.0    |        | <1.0        |        | <1.0          |        | <3.0   |        | <5.0   | U / UJ | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  |        | <1.0  |        | <1.0            |  |
|            | MW808                   | 4/16/2012 | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          |        | <1.0    |        | <1.0    |        | <1.0        |        | <1.0          |        | <3.0   |        | <5.0   |        | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  |        | <1.0  |        | <1.0            |  |
|            | MW809                   | 2/29/2012 | <5.0    |        | <1.0    |        | <5.0             |        | <1.0          |        | <1.0          | U / UJ | <1.0    |        | <1.0    |        | <1.0        |        | <1.0          |        | <3.0   |        | <5.0   | U / UJ | <1.0        |        | <1.0  |        | <1.0    |        | <1.0      |        | <1.0  |        | <1.0  |        | <1.0            |  |
| MW809(DUP) | 2/29/2012               | <5.0      |         | <1.0   |         | <5.0   |                  | <1.0   |               | <1.0   | U / UJ        | <1.0   |         | <1.0   |         | <1.0   |             | <1.0   |               | <3.0   |        | <5.0   | U / UJ | <1.0   |             | <1.0   |       | <1.0   |         | <1.0   |           | <1.0   |       | <1.0   |       | <1.0   |                 |  |
| MW809      | 4/16/2012               | <5.0      |         | <1.0   |         | <5.0   |                  | <1.0   |               | <1.0   |               | <1.0   |         | <1.0   |         | <1.0   |             | <1.0   |               | <3.0   |        | <5.0   |        | <1.0   |             | <1.0   |       | <1.0   |         | <1.0   |           | <1.0   |       | <1.0   |       | <1.0   |                 |  |

Footnotes:

(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the Long Term Monitoring Plan (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:

An abbreviated list of compounds is used for reporting based on historically detected and reported compounds.

µg/L = micrograms per liter

< = Result shows laboratory method reporting limit for non-detected results

1,1,1-TCA = 1,1,1-Trichloroethane

1,1-DCA = 1,1-Dichloroethane

1,2-DCA = 1,2-Dichloroethane

Bolded result indicates Project Action Limit (RG) exceedance

cis-1,2-DCE = cis-1,2-Dichloroethene

DUP = duplicate

F = Concentration below the reported detection limit

LF/VF = Lab Flag/Validation Flag

MEK = Methyl Ethyl Ketone (2-butanone)

MethCl = Methylene Chloride

NS = No standard

PCE = Tetrachloroethene

TCE = Trichloroethene

U = Not detected

UJ = Not detected, estimated detection limit

VC = Vinyl chloride

Table 3-5

**Summary of Analytical Results - Semivolatile Organic Compounds**  
**2012 Semi-Annual Groundwater Monitoring Report**  
**Joliet Army Ammunition Plant**  
**Will County, Illinois**

| Site | Compound                            |           | 2,4-DNT    |        | 2,6-DNT |        | Naphthalene |        | NB     |        | 2-Methylnaphthalene |        | Phenol |        |
|------|-------------------------------------|-----------|------------|--------|---------|--------|-------------|--------|--------|--------|---------------------|--------|--------|--------|
|      | Units                               |           | µg/L       |        | µg/L    |        | µg/L        |        | µg/L   |        | µg/L                |        | µg/L   |        |
|      | Project Action Limit <sup>(1)</sup> |           | 0.42       |        | 0.42    |        | NS          |        | 51     |        | NS                  |        | NS     |        |
| Site | Well                                | Date      | Result     | LF/VF  | Result  | LF/VF  | Result      | LF/VF  | Result | LF/VF  | Result              | LF/VF  | Result | LF/VF  |
| M11  | <i>Upgradient</i>                   |           |            |        |         |        |             |        |        |        |                     |        |        |        |
|      | MW802                               | 4/16/2012 | <1.3       |        | <0.47   |        | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |
|      | <i>Downgradient</i>                 |           |            |        |         |        |             |        |        |        |                     |        |        |        |
|      | MW335                               | 4/16/2012 | <1.3       |        | <0.47   |        | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |
|      | MW336                               | 4/16/2012 | <1.3       |        | <0.47   |        | <0.93       |        | <0.93  |        | <0.47               |        | <4.7   |        |
|      | MW805                               | 4/16/2012 | <1.3       |        | <0.47   |        | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |
| M13  | <i>Upgradient</i>                   |           |            |        |         |        |             |        |        |        |                     |        |        |        |
|      | MW806                               | 2/29/2012 | <1.3       |        | <0.47   |        | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |
|      | MW806                               | 4/16/2012 | <1.3       |        | <0.47   |        | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |
|      | MW807                               | 2/29/2012 | <1.3       |        | <0.47   |        | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |
|      | MW807                               | 4/16/2012 | <1.3       |        | <0.47   |        | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |
|      | <i>Downgradient</i>                 |           |            |        |         |        |             |        |        |        |                     |        |        |        |
|      | AEHA14R                             | 3/1/2012  | <1.3       | U / UJ | <0.47   | U / UJ | <0.93       | U / UJ | <0.93  | U / UJ | <0.47               | U / UJ | <4.7   | U / UJ |
|      | AEHA15                              | 3/1/2012  | <1.5       |        | <0.53   |        | <1.1        |        | <1.1   |        | <0.53               | U / UJ | <5.3   |        |
|      | MW126R                              | 2/29/2012 | <1.3       |        | <0.48   |        | <0.95       |        | <0.95  |        | <0.48               | U / UJ | <4.8   |        |
|      | MW126R                              | 4/16/2012 | <1.3       |        | <0.47   |        | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |
|      | MW362                               | 2/29/2012 | <1.3       |        | <0.47   |        | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |
|      | MW362                               | 4/16/2012 | <b>3.3</b> |        | 0.25    | F /    | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |
|      | MW362(DUP)                          | 4/16/2012 | <b>2.6</b> |        | 0.29    | F /    | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |
|      | <i>Downgradient</i>                 |           |            |        |         |        |             |        |        |        |                     |        |        |        |
|      | MW808                               | 2/29/2012 | <1.3       |        | <0.47   |        | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |
|      | MW808                               | 4/16/2012 | <1.3       |        | <0.47   |        | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |
|      | MW809                               | 2/29/2012 | <1.3       |        | <0.47   |        | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |
|      | MW809(DUP)                          | 2/29/2012 | <1.3       |        | <0.47   |        | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |
|      | MW809                               | 4/16/2012 | <1.3       |        | <0.47   |        | <0.93       |        | <0.93  |        | <0.47               | U / UJ | <4.7   |        |

**Footnotes:**

(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the Long Term Monitoring Plan (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

**General Notes:**

An abbreviated list of compounds analyzed is used for reporting based on historically detected and reported compounds.

< = Result shows laboratory method reporting limit for non-detected results

µg/L = micrograms per liter

2,4-DNT = 2,4-dinitrotoluene

2,6-DNT = 2,6-dinitrotoluene

Bolded result indicates Project Action Limit (RG) exceedance

DUP = duplicate

F = Concentration below the reported detection limit

LF/VF = Lab Flag/Validation Flag

NB = nitrobenzene

NS = No standard

R = Rejected data, unusable

U = Not detected

UJ = Not detected, estimated detection limit

Table 3-6

**Groundwater Horizontal Gradients**  
**2012 Semi-Annual Groundwater Monitoring Report**  
**Joliet Army Ammunition Plant**  
**Will County, Illinois**

| February 2012      |                                   |                                   |                         |                               |                        | April 2012                        |                                   |                         |                               |                        |  |
|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------------|------------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------------|------------------------|--|
| Site               | Well Number                       | Well Number                       | Head<br>Difference (ft) | Horizontal<br>Separation (ft) | Horizontal<br>Gradient | Well Number                       | Well Number                       | Head<br>Difference (ft) | Horizontal<br>Separation (ft) | Horizontal<br>Gradient |  |
|                    | Groundwater<br>Elevation (ft MSL) | Groundwater<br>Elevation (ft MSL) |                         |                               |                        | Groundwater<br>Elevation (ft MSL) | Groundwater<br>Elevation (ft MSL) |                         |                               |                        |  |
| LAP AREA           |                                   |                                   |                         |                               |                        |                                   |                                   |                         |                               |                        |  |
| L1                 | MW176                             | MW173                             |                         |                               | L1 (North)             | MW176                             | MW173                             |                         |                               | L1 (North)             |  |
|                    | NM                                | NM                                | NM                      | 1620                          | NM                     | 622.35                            | 603.31                            | 19.04                   | 1620                          | 0.0118                 |  |
|                    | MW611                             | MW610                             |                         |                               | L1 (South)             | MW611                             | MW610                             |                         |                               | L1 (South)             |  |
|                    | NM                                | NM                                | NM                      | 400                           | NM                     | 606.44                            | 601.41                            | 5.03                    | 400                           | 0.0126                 |  |
| L3/<br>Landfill L3 | MW1                               | MW410                             |                         |                               |                        | MW1                               | MW410                             |                         |                               |                        |  |
|                    | NM                                | NM                                | NM                      | 780                           | NM                     | 613.86                            | 592.32                            | 21.54                   | 780                           | 0.0276                 |  |
| MFG AREA           |                                   |                                   |                         |                               |                        |                                   |                                   |                         |                               |                        |  |
| M1                 | MW107                             | MW643                             |                         |                               |                        | MW107                             | MW643                             |                         |                               |                        |  |
|                    | NM                                | NM                                | NM                      | 430                           | NM                     | 546.34                            | 533.30                            | 13.04                   | 430                           | 0.0303                 |  |
| M6                 | MW650                             | MW165                             |                         |                               | M6 (North)             | MW650                             | MW165                             |                         |                               | (North)                |  |
|                    | NM                                | NM                                | NM                      | 930                           | NM                     | 555.61                            | 538.21                            | 17.40                   | 930                           | 0.0187                 |  |
|                    | MW309                             | MW160                             |                         |                               | M6 (South)             | MW309                             | MW160                             |                         |                               | (South)                |  |
|                    | NM                                | NM                                | NM                      | 840                           | NM                     | 554.33                            | 535.46                            | 18.87                   | 840                           | 0.0225                 |  |
| M7                 | MW307                             | MW216                             |                         |                               |                        | MW307                             | MW216                             |                         |                               |                        |  |
|                    | NM                                | NM                                | NM                      | 1200                          | NM                     | 544.01                            | 531.43                            | 12.58                   | 1200                          | 0.0105                 |  |
| Landfill M13       | AEHA14R                           | MW126R                            |                         |                               |                        | AEHA14R                           | MW126R                            |                         |                               |                        |  |
|                    | 551.97                            | 546.38                            | 5.59                    | 1160                          | 0.0048                 | 551.90                            | 546.46                            | 5.44                    | 1160                          | 0.0047                 |  |
| Landfill M11       | MW802                             | MW804                             |                         |                               |                        | MW802                             | MW804                             |                         |                               |                        |  |
|                    | NM                                | NM                                | NM                      | 1030                          | NM                     | 536.73                            | 531.41                            | 5.32                    | 1030                          | 0.0052                 |  |

General Notes:

ft = feet

MSL = mean sea level

NM = Not Applicable, water levels not measured.

**Table 3-7**

**Groundwater Flow Velocities  
2012 Semi-Annual Groundwater Monitoring Report  
Joliet Army Ammunition Plant  
Will County, Illinois**

| Site   | Average<br>K (cm/sec) | February<br>Horizontal<br>Gradient | April<br>Horizontal<br>Gradient | Effective<br>Porosity | February             |                      | April                |                      |
|--|-----------------------|------------------------------------|---------------------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|
|  |                       |                                    |                                 |                       | Velocity<br>(cm/sec) | Velocity<br>(ft/day) | Velocity<br>(cm/sec) | Velocity<br>(ft/day) |
| <b>L1<sup>(1)</sup></b>                          | 9.2E-06               | NM                                 | 0.0122                          | 0.3                   | NM                   | NM                   | 0.0000               | 0.0011               |
| <b>L3/Landfill L3<sup>(2)</sup></b>              | 1.6E-03               | NM                                 | 0.0276                          | 0.3                   | NM                   | NM                   | 0.0001               | 0.4172               |
| <b>M1</b>  | 6.6E-05               | NM                                 | 0.0303                          | 0.3                   | NM                   | NM                   | 0.0000               | 0.0189               |
| <b>MFG (M6)<sup>(3)</sup></b>                    | 8.6E-04               | NM                                 | 0.0206                          | 0.3                   | NM                   | NM                   | 0.0001               | 0.1674               |
| <b>MFG (M7)</b>                                  | 6.7E-04               | NM                                 | 0.0105                          | 0.3                   | NM                   | NM                   | 0.0000               | 0.0665               |
| <b>MFG (Landfill M13)</b>                        | 8.0E-02               | 0.0048                             | 0.0047                          | 0.3                   | 0.0013               | 3.6274               | 0.0013               | 3.5518               |
| <b>Average for MFG Sites<br/>M6, M7, and M13</b> | 2.7E-02               | NM                                 | 0.0119                          | 0.3                   | NM                   | NM                   | 0.0004               | 1.2619               |
| <b>Landfill M11<sup>(4)</sup></b>                | 6.7E-04               | NM                                 | 0.0052                          | 0.3                   | NM                   | NM                   | 0.00001              | 0.0329               |

**General Notes:**

Hydraulic conductivity values are averages for the overburden aquifer.

Horizontal gradients are calculated using water table elevation data.

K = Hydraulic Conductivity

NM = Water levels not measured.

MFG = Manufacturing Area Sites.

cm/sec = centimeters per second

ft = feet

**Footnotes:**

(1) Average of north and south gradients at L1 used for April measurements.

(2) No hydraulic conductivity data were available for Site L3. Values used are from nearby Site L2.

(3) Average of north and south gradients at M6 used for April measurements.

(4) No hydraulic conductivity data were available for Site M11 Landfill. Value used is from nearby Site M7.

Table 3-8

**Vertical Gradients**  
**2012 Semi-Annual Groundwater Monitoring Report**  
**Joliet Army Ammunition Plant**  
**Will County, Illinois**

| Site                       | Area/Well ID | Ground Elevation (ft MSL) | Depth (ft) to top of screen (from ground) | Depth (ft) to bottom of screen (from ground) | Screen Length (feet) | Elevation of Screen Midpoint (ft MSL) | Groundwater Elevation 2/12 (ft MSL) | Vertical Gradient 2/12 (ft/ft) | Groundwater Elevation 4/12 (ft MSL) | Vertical Gradient 4/12 (ft/ft) |
|----------------------------|--------------|---------------------------|---|--|----------------------|---------------------------------------|-------------------------------------|--------------------------------|-------------------------------------|--------------------------------|
| LOAD-ASSEMBLE-PACKAGE AREA |              |                           |   |  |                      |                                       |                                     |                                |                                     |                                |
| L1                         | MW178        | 640.39                    | 27.3                                      | 46.5   | 19.2                 | 603.49                                | NM                                  | NM                             | 615.82                              | -0.3462                        |
|                            | MW176        | 643.49                    | 4.8                                       | 20.8   | 16.0                 | 630.69                                | NM                                  |                                | 622.35                              |                                |
|                            |              |                           |   |  |                      |                                       |                                     |                                |                                     |                                |
|                            | MW172        | 613.19                    | 14.5                                      | 34.5   | 20.0                 | 588.69                                | NM                                  | NM                             | 603.35                              | 0.0027                         |
|                            | MW173        | 612.56                    | 2.8                                       | 11.8   | 9.0                  | 605.26                                | NM                                  |                                | 603.31                              |                                |
|                            |              |                           |   |  |                      |                                       |                                     |                                |                                     |                                |
|                            | MW177        | 613.84                    | 11.8                                      | 31.0   | 19.2                 | 592.44                                | NM                                  | NM                             | 608.30                              | 0.0538                         |
|                            | MW171        | 615.03                    | 2.9                                       | 7.9  | 5.0                  | 609.63                                | NM                                  |                                | 607.49                              |                                |
|                            |              |                           |   |  |                      |                                       |                                     |                                |                                     |                                |
|                            | MW401        | 610.2                     | 28.5                                      | 43.5   | 15.0                 | 574.20                                | NM                                  | NM                             | 601.50                              | 0.0033                         |
| MW610                      | 609.62       | 4.0                       | 14.0                                      | 10.0   | 600.62               | NM                                    | 601.41                              |                                |                                     |                                |
| L3/<br>Landfill L3         | MW631        | 592.23                    | 16.0                                      | 26.0   | 10.0                 | 571.23                                | NM                                  | NM                             | 590.33                              | 0.1170                         |
|                            | MW630        | 592.23                    | 7.0                                       | 12.0   | 5.0                  | 582.73                                | NM                                  |                                | 588.33                              |                                |
| MANUFACTURING AREA         |              |                           |   |  |                      |                                       |                                     |                                |                                     |                                |
| M1                         | MW640        | 545.4                     | 29.0                                      | 39.0   | 10.0                 | 511.40                                | NM                                  | NM                             | 544.17                              | 0.0218                         |
|                            | MW351        | 545.68                    | 9.5                                       | 19.5   | 10.0                 | 531.18                                | NM                                  |                                | 543.47                              |                                |
|                            |              |                           |   |  |                      |                                       |                                     |                                |                                     |                                |
|                            | MW642        | 545.08                    | 29.0                                      | 39.0   | 10.0                 | 511.08                                | NM                                  | NM                             | 541.72                              | -0.0179                        |
| MW641                      | 545.08       | 7.0                       | 17.0                                      | 10.0   | 533.08               | NM                                    | 542.28                              |                                |                                     |                                |
| MFG (M6)                   | MW312        | 545.96                    | 40.0                                      | 55.0   | 15.0                 | 498.46                                | NM                                  | NM                             | 547.55                              | 0.0002                         |
|                            | MW311        | 546.36                    | 14.0                                      | 24.0   | 10.0                 | 527.36                                | NM                                  |                                | 547.54                              |                                |
|                            |              |                           |   |  |                      |                                       |                                     |                                |                                     |                                |
|                            | MW319        | 545.49                    | 40.0                                      | 55.0   | 15.0                 | 497.99                                | NM                                  | NM                             | 537.55                              | -0.0030                        |
|                            | MW318        | 545.23                    | 11.8                                      | 21.8   | 10.0                 | 528.43                                | NM                                  |                                | 537.67                              |                                |
|                            |              |                           |   |  |                      |                                       |                                     |                                |                                     |                                |
|                            | MW313        | 549.20                    | 25.0                                      | 40.0   | 15.0                 | 516.70                                | NM                                  | NM                             | 539.04                              | 0.0201                         |
|                            | MW654        | 548.49                    | 13.0                                      | 23.0   | 10.0                 | 530.49                                | NM                                  |                                | 538.60                              |                                |
|                            |              |                           |   |  |                      |                                       |                                     |                                |                                     |                                |
|                            | MW317        | 540.71                    | 34.0                                      | 49.0   | 15.0                 | 499.21                                | NM                                  | NM                             | 536.28                              | -0.0123                        |
|                            | MW316        | 540.49                    | 13.0                                      | 18.0   | 5.0                  | 524.99                                | NM                                  |                                | 536.74                              |                                |
|                            |              |                           |   |  |                      |                                       |                                     |                                |                                     |                                |
|                            | MW310R       | 563.00                    | 44.5                                      | 59.5   | 15.0                 | 511.00                                | NM                                  | NM                             | 543.11                              | -0.2589                        |
|                            | MW309        | 563.43                    | 12.7                                      | 27.7   | 15.0                 | 543.23                                | NM                                  |                                | 554.33                              |                                |
|                            |              |                           |   |  |                      |                                       |                                     |                                |                                     |                                |
|                            | MW315        | 538.91                    | 29.7                                      | 44.7   | 15.0                 | 501.71                                | NM                                  | NM                             | 535.41                              | -0.0003                        |
|                            | MW314        | 539.53                    | 9.7                                       | 14.7   | 5.0                  | 527.33                                | NM                                  |                                | 535.42                              |                                |
|                            |              |                           |   |  |                      |                                       |                                     |                                |                                     |                                |

Table 3-8

**Vertical Gradients**  
**2012 Semi-Annual Groundwater Monitoring Report**  
**Joliet Army Ammunition Plant**  
**Will County, Illinois**

| Site         | Area/Well ID | Ground Elevation (ft MSL) | Depth (ft) to top of screen (from ground) | Depth (ft) to bottom of screen (from ground) | Screen Length (feet) | Elevation of Screen Midpoint (ft MSL) | Groundwater Elevation 2/12 (ft MSL) | Vertical Gradient 2/12 (ft/ft) | Groundwater Elevation 4/12 (ft MSL) | Vertical Gradient 4/12 (ft/ft) |
|--------------|--------------|---------------------------|---|--|----------------------|---------------------------------------|-------------------------------------|--------------------------------|-------------------------------------|--------------------------------|
| MFG (M6)     | MW308        | 561.38                    | 50.5                                      | 65.5   | 15.0                 | 503.38                                | NM                                  | NM                             | 542.26                              | -0.0431                        |
|              | MW307        | 561.45                    | 17.0                                      | 27.0   | 10.0                 | 539.45                                | NM                                  |                                | 544.01                              |                                |
| MFG (M7)     | MW158        | 531.58                    | 9.0                                       | 29.5   | 20.5                 | 512.33                                | NM                                  | NM                             | 530.34                              | 0.0000                         |
|              | MW157        | 531.37                    | 3.7                                       | 10.2   | 6.5                  | 524.42                                | NM                                  |                                | 530.34                              |                                |
|              | MW217        | 536.90                    | 19.5                                      | 34.5   | 15.0                 | 509.90                                | NM                                  | NM                             | 531.94                              | 0.0237                         |
|              | MW216        | 536.51                    | 5.0                                       | 10.0   | 5.0                  | 529.01                                | NM                                  |                                | 531.43                              |                                |
|              | MW322        | 542.26                    | 34.5                                      | 49.5   | 15.0                 | 500.26                                | NM                                  | NM                             | 533.79                              | -0.1052                        |
|              | MW321        | 542.93                    | 13.5                                      | 23.5   | 10.0                 | 524.43                                | NM                                  |                                | 537.73                              |                                |
|              | MW661        | 537.09                    | 20.0                                      | 30.0   | 10.0                 | 512.09                                | NM                                  | NM                             | 532.82                              | -0.0486                        |
|              | MW660        | 537.08                    | 7.0                                       | 12.0   | 5.0                  | 527.58                                | NM                                  |                                | 533.88                              |                                |
|              | MW802        | 541.62                    | 5.0                                       | 15.0   | 10.0                 | 531.62                                | NM                                  | NM                             | 536.73                              | 0.1327                         |
|              | MW803        | 541.56                    | 26.5                                      | 36.5   | 10.0                 | 510.06                                | NM                                  |                                | 540.27                              |                                |
| Landfill M13 | MW804        | 533.78                    | 5.0                                       | 15.0   | 10.0                 | 523.78                                | NM                                  | NM                             | 531.41                              | -0.0115                        |
|              | MW805        | 533.62                    | 25.0                                      | 35.0   | 10.0                 | 503.62                                | NM                                  |                                | 531.09                              |                                |
|              | MW126R       | 563.00                    | 11.0                                      | 21.0   | 10.0                 | 547.00                                | 546.38                              | 0.2106                         | 546.46                              | 0.1939                         |
|              | MW362        | 562.78                    | 28.0                                      | 33.0   | 5.0                  | 532.28                                | 549.35                              |                                | 549.21                              |                                |
|              | MW363        | 567.66                    | 21.0                                      | 31.0   | 10.0                 | 541.66                                | 542.18                              | -0.0057                        | 542.13                              | 0.0007                         |
|              | MW364        | 567.69                    | 37.0                                      | 42.0   | 5.0                  | 528.19                                | 542.10                              |                                | 542.14                              |                                |
|              | MW806        | 563.73                    | 15.0                                      | 25.0   | 10.0                 | 543.73                                | 551.55                              | -0.0421                        | 551.44                              | -0.0463                        |
|              | MW807        | 563.79                    | 35.0                                      | 45.0   | 10.0                 | 523.79                                | 550.38                              |                                | 550.16                              |                                |
|              | MW808        | 567.33                    | 15.0                                      | 25.0   | 10.0                 | 547.33                                | 551.85                              | -0.1131                        | 552.14                              | -0.1319                        |
|              | MW809        | 567.28                    | 35.0                                      | 45.0   | 10.0                 | 527.28                                | 549.07                              |                                | 548.86                              |                                |

**Notes:**

Water Level in Deep Well - Water Level in Shallow Well

Vertical Gradient = -----

ABS (Water Table Elevation - Screen Midpoint of Deep Well)

Negative vertical gradients indicate downward flow, positive indicates upward flow.

ft = feet

ft/ft = feet per foot

MSL = mean sea level

NM = not measured

ID = identification

MFG = Manufacturing Area Sites

TABLE 3-9

**Proposed Sample Plan - Fall 2012**  
**2012 Semi-Annual Groundwater Monitoring Report**  
**Joliet Army Ammunition Plant**  
**Wilmington, Illinois**

| Site               | Well ID                           | Parameter |
|--------------------|-----------------------------------|-----------|
| L1                 | <i>In-plume</i>                   |           |
|                    | MW131                             | E         |
|                    | MW173                             | E         |
|                    | WES1                              | E         |
|                    | <i>Early Warning</i>              |           |
|                    | WES3                              | E         |
|                    | MW174                             | E         |
|                    | <i>Compliance</i>                 |           |
|                    | SW550                             | E         |
| L2                 | <i>In-plume</i>                   |           |
|                    | MW404                             | E         |
|                    | <i>Early Warning</i>              |           |
|                    | MW620                             | E         |
|                    | <i>Compliance</i>                 |           |
|                    | MW621                             | E         |
| L3/<br>Landfill L3 | <i>In-plume/Downgradient</i>      |           |
|                    | MW410                             | E         |
|                    | MW412                             | E, M      |
|                    | <i>Early Warning/Downgradient</i> |           |
|                    | MW630                             | E, M      |
|                    | MW631                             | E, M      |
|                    | MW633                             | E, M      |
|                    | <i>Compliance/Downgradient</i>    |           |
|                    | SW777                             | E, M      |
|                    | <i>Downgradient</i>               |           |
|                    | SW557                             | E, M      |
| L14                | <i>In-plume</i>                   |           |
|                    | MW511                             | E         |
|                    | MW512                             | E         |
|                    | <i>Early Warning</i>              |           |
|                    | H7                                | E         |
|                    |                                   |           |
|                    | MW603                             | E         |
| M1                 | <i>In-plume</i>                   |           |
|                    | MW107                             | S         |
|                    | MW231                             | S         |
|                    | MW640                             | S         |
|                    | MW641                             | S         |
|                    | MW642                             | S         |
|                    | <i>Early Warning</i>              |           |
|                    | MW643                             | S         |
|                    | MW644                             | S         |
|                    | <i>Compliance</i>                 |           |
|                    | MW645                             | S         |
|                    | MW646                             | S         |
|                    | MW648                             | S         |
|                    | MW649                             | S         |
|                    | SW709                             | S         |

**TABLE 3-9**

**Proposed Sample Plan - Fall 2012  
2012 Semi-Annual Groundwater Monitoring Report  
Joliet Army Ammunition Plant  
Wilmington, Illinois**

| Site                        | Well ID              | Parameter         |
|-----------------------------|----------------------|-------------------|
| MFG                         | <i>In-plume</i>      |                   |
|                             | MW212R               | E                 |
|                             | MW330                | S                 |
|                             | MW652                | E                 |
|                             | <i>Early Warning</i> |                   |
|                             | MW123R               | E                 |
|                             | MW124R               | E                 |
|                             | MW162R               | E                 |
|                             | MW313                | E                 |
|                             | MW318                | E                 |
|                             | MW319                | E                 |
|                             | MW654                | E                 |
|                             | <i>Compliance</i>    |                   |
|                             | MW117                | E                 |
|                             | MW118                | E                 |
|                             | MW119                | E                 |
| Landfill M11                | <i>Upgradient</i>    |                   |
|                             | MW802                | E, I, M, SVOC & V |
|                             | <i>Downgradient</i>  |                   |
|                             | MW335                | E, I, M, SVOC & V |
|                             | MW336                | E, I, M, SVOC & V |
| Landfill M13 <sup>(1)</sup> | MW805                | E, I, M, SVOC & V |
|                             | <i>Upgradient</i>    |                   |
|                             | MW806                | E, I, M, SVOC & V |
|                             | MW807                | E, I, M, SVOC & V |
|                             | <i>Downgradient</i>  |                   |
|                             | MW126R               | E, I, M, SVOC & V |
|                             | MW362                | E, I, M, SVOC & V |
|                             | MW808                | E, I, M, SVOC & V |
|                             | MW809                | E, I, M, SVOC & V |

**General Notes:**

V - Volatile Organic Compounds (VOCs)  
SVOC - Semivolatile organic compounds  
E - Explosives  
M - Metals  
I - Indicator parameters (Nitrate-N and Sulfate)  
S - Sulfate  
MFG - Manufacturing Area

**Footnotes:**

- (1) Site M13 Landfill monitoring wells are sampled quarterly for these parameters in compliance with Illinois Administrative Code.

TABLE 4-1

Summary of Recommendations

2012 Semi-annual Groundwater Monitoring Report

Joliet Army Ammunition Plant

Will County, Illinois

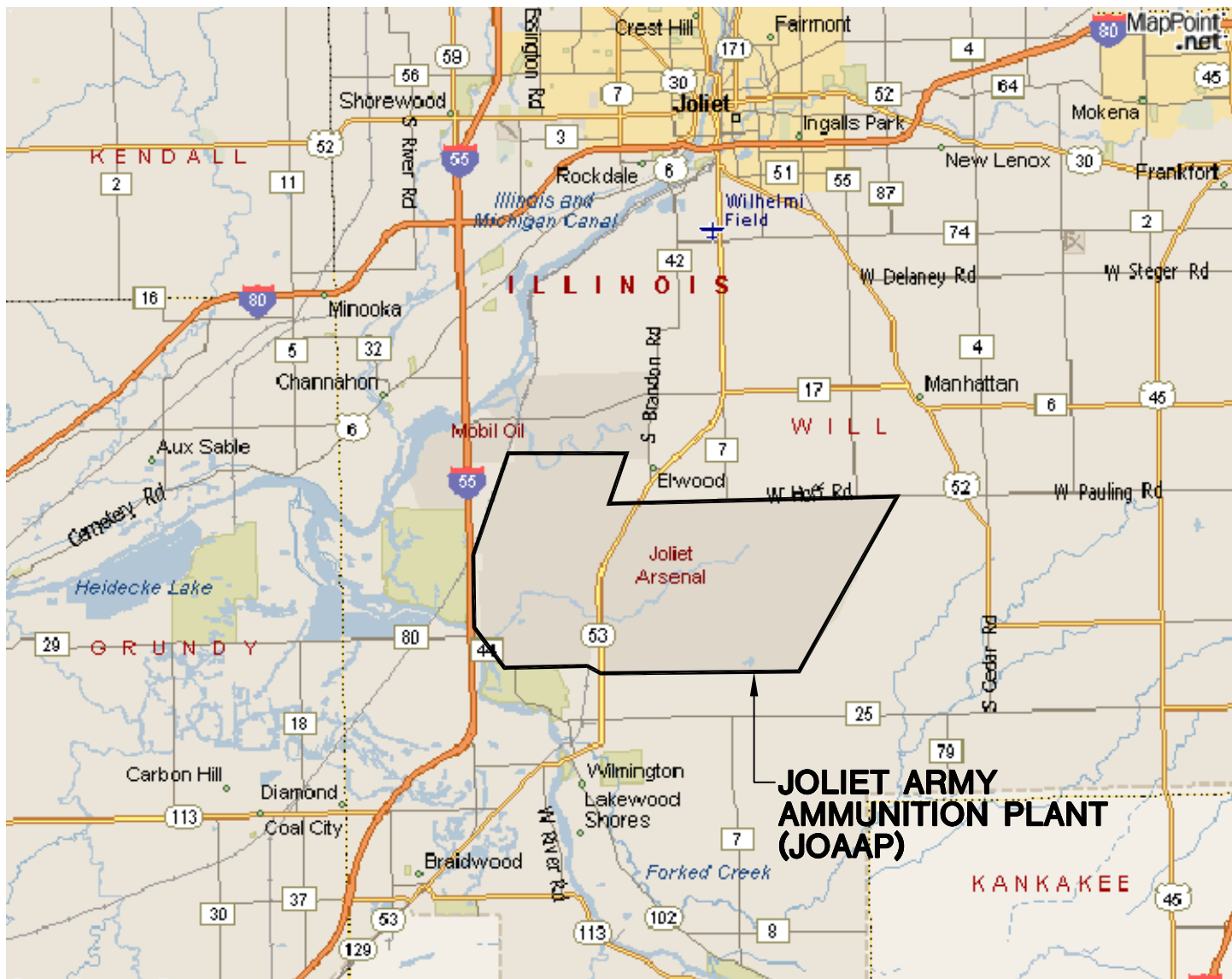
| Report           | Recommendation  | Reasoning   | Status<br>Initiated/Pending  |
|------------------|---|---|--|
| 2009 Semi-annual |   |   |  |
|                  | No recommendations regarding the monitoring program   |   |  |
| 2009 Annual      |   |   |  |
|                  | Fall Sampling only at L2  | Section 4.1.2.5 of LTM Plan, round with highest concentration   | Initiated, Site L2 will not be sampled spring 2012   |
|                  | Remove TAL metals analysis from Site L3 well MW410  | No metals exceedances since sampling re-initiated in spring 2008  | Initiated, metals at well MW410 were not sampled beginning fall 2011   |
|                  | Remove Site M5 well MW207R from monitoring program  | Section 4.1.7.4 of LTM Plan, no RG exceedances for 4 rounds   | Initiated, well MW207R was not sampled beginning fall 2011   |
|                  | Remove Site M3 wells MW233 and MW352 from monitoring program                                    | Section 4.1.6.5 of LTM Plan, no RG exceedances for 4 rounds   | Initiated, wells MW233 and MW352 were not sampled beginning fall 2011  |
|                  | Prepare closure report for Site M3  | Section 4.1.6.6 of LTM Plan, no RG exceedances for 4 rounds   | Closure Report will be prepared in 2013  |
| 2010 Semi-annual |   |   |  |
|                  | Remove Site L2 well MW501 from monitoring program   | Section 4.1.2.5 of LTM Plan, no RG exceedances for 4 rounds   | Initiated, well MW501 was not sampled fall beginning 2011  |
|                  | Fall Sampling only at L14   | Section 4.1.4.5 of LTM Plan, round with highest concentration   | Initiated, Site L14 will not be sampled spring 2012  |
|                  | Prepare closure report for Site M5  | Section 4.1.7.4 of LTM Plan, no RG exceedances for 4 rounds   | Closure Report will be prepared in 2013  |
|                  | Remove cadmium analysis from Site M6 well MW123R  | Section 4.1.7.4 of LTM Plan, no cadmium detections  | Initiated, cadmium at well MW123R was not analyzed beginning fall 2010   |
| 2010 Annual      |   |   |  |
|                  | Remove Site L1 compliance well MW401 from monitoring program                                    | No explosives detections. Site has upgradient early warning wells with no detections  | Initiated, well MW401 will not be sampled beginning spring 2012  |
|                  | Remove Site L1 early warning well MW172 from monitoring program                                 | Well MW172 redundant with well MW173, upward vertical gradients   | Initiated, well MW172 will not be sampled beginning spring 2012  |
|                  | Change designation of Site L1 well MW173 to in-plume  | Migration of contaminants   | Initiated in 2011 Annual Report  |
|                  | Remove Site L2 compliance well MW810 from monitoring program                                    | No explosives detections. Site had upgradient early warning wells with no detections  | Initiated, L2 is no longer sampled in spring and well MW810 will not be sampled in fall 2012                                   |
|                  | Remove Site L3 compliance well MW632 from monitoring program                                    | No explosives detections. Hydraulics suggest well not within migration flowpath   | Initiated, well MW632 will not be sampled beginning spring 2012  |
|                  | Change designation of Site M1 wells MW640, MW641, and MW642 to in-plume                         | Migration of contaminants   | Initiated in 2011 Annual Report  |
|                  | Remove Site M8 in-plume well MW148RR from monitoring program                                    | In-plume well with no sulfate exceedances since spring 2009   | Initiated, well MW148RR will not be sampled beginning spring 2012  |
|                  | Remove Site M13 wells AEHA14R and AEHA15 from monitoring program and abandon                    | Problematic wells   | Initiated, wells AEHA14R and AEHA15 will not be sampled beginning spring 2012  |
| 2011 Semi-annual |   |   |  |
|                  | No new recommendations  |   |  |
| 2011 Annual      |   |   |  |
|                  | At Site L3/Landfill L3 sample SW004 in spring only  | Upstream sample SW555 provides data for fall rounds   | Initiated, SW004 will no longer be sampled in fall when Site L2 is sampled   |
|                  | Rip rap along Prairie Creek at Site L3 required repair  | Rip rap has been washed away at some locations  | Pending  |
|                  | Remove Site Landfill L3/Landfill L3 upgradient well MW03 from monitoring program                | No RG exceedances at Site L3 in-pume well MW410   | Initiated, well MW03 will not be sampled beginning spring 2012   |
|                  | Remove Site L14 in-plume well MW508 from monitoring program                                     | No RG exceedances   | Initiated, well MW508 will not be sampled beginning spring 2012  |
|                  | Remove Site L14 compliance wells MW603 and MW604 from monitoring program                        | Redundant, no RG exceedances in early warning well H7   | Initiated, wells MW603 and MW604 will not be sampled beginning spring 2012   |
|                  | Remove MFG compliance wells MW115 and MW116 from monitoring program                             | Redundant, no RG exceedances in upgradient Site M6 early warning wells MW123R and MW162R or Site M7 early warning well MW124R | Initiated, wells MW115 and MW116 will not be sampled beginning spring 2012   |
|                  | Remove MFG compliance wells MW112 and MW113 from monitoring program                             | Removal of upgradient Site M5 in-plume well MW207R from monitoring program and Site M5 closure                                | Initiated, wells MW112 and MW113 will not be sampled beginning spring 2012   |
|                  | Prepare closure report for Site M8  | Removal of in-plume well MW148RR from monitoring program  | Closure Report will be prepared in 2013  |
|                  | Fall Sampling only at M11   | Section 4.2.2.5 of LTM Plan, stable and predictable results   | Pending, recommendation has not been approved. However wells MW333, MW334, MW803, and MW804 will not be sampled in spring 2012 |
| 2012 Semi-annual |   |   |  |
|                  | Rip rap along Prairie Creek at Site L3 required repair  | Rip rap has been washed away at some locations  | Pending  |
|                  | Install monitoring well downgradient of Site M13 to replace monitoring wells AEHA14R and AEHA15 | Monitoirng wells AEHA14R and AEHA15 removed from monitoring program.  | Pending  |

Notes:

Does not include minor maintenance activities such as replacing well locks.

Does not include recommendations repeated in subsequent reports.

## FIGURES



## NOTE

BASE MAP DEVELOPED FROM  
2002 MICROSOFT CORPORATION,  
EXPEDIA.COM.



RJR  
DEVELOPED BY  
[Signature]  
APPROVED  
DATE: 12/18/28  
REVISIONS  
DATE:

CONTRACT NO. W91ZLK-05-D-0012  
DELIVERY ORDER NO. 0001

VERIFY SCALE  
0 1/2 1  
BAR REPRESENTS ONE INCH

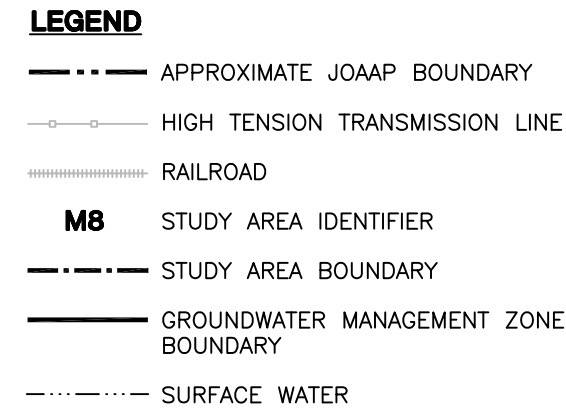
SCALE  
1" = 4 Miles  
(Approx.)



SITE LOCATION MAP

2012 SEMI-ANNUAL  
GROUNDWATER MONITORING REPORT  
JOLIET ARMY AMMUNITION PLANT  
WILL COUNTY, ILLINOIS

FIGURE 1-1

**TOUEST, INC.**



|   |  |                                       |   |
|---|--|---------------------------------------|---|
| <p><b>VERIFY SCALE</b></p>  <p>0      1/2      1</p> |  | <p><b>SCALE</b></p> <p>1" = 4000'</p> |   |
| <p>BAR REPRESENTS<br/>ONE INCH ON ORIGINAL</p>  |  | <p>RJR</p> <p>DEVELOPED BY</p>        | <p>DLF</p> <p>DRAWN BY</p>  |
| <p>APPROVED BY</p>                                   |  | <p>12/18/12</p> <p>DATE</p>           | <p>CONTRACT NO. W91ZLK-05-D-00012</p> <p>DELIVERY ORDER NO. 00001</p> |

| REV | DATE | BY | DESCRIPTION |
|-----|------|----|-------------|
|     |      |    |             |

GROUNDWATER STUDY AREAS AND LANDFILL SITES

---

2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT  
JOLIET ARMY AMMUNITION PLANT  
WILL COUNTY, ILLINOIS

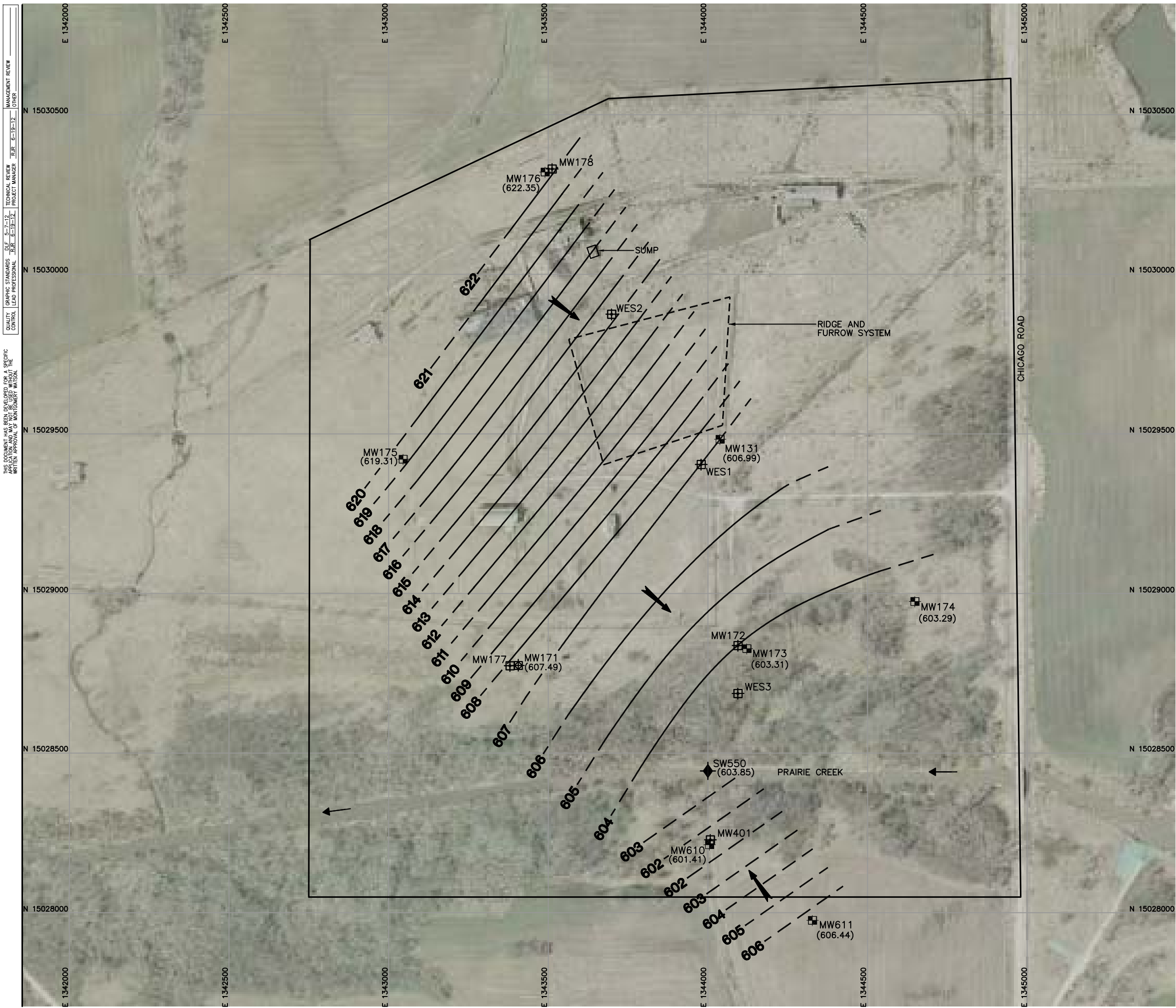
PRINTED

12/18/2012

**FIGURE 1-2**

DRAWING NUMBER  
2091115  
05010401

***TOQUEST, INC.***



- LEGEND**
- MW175 (619.31) OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
  - MW171 (607.49) SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
  - MW178 DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
  - SW550 (603.85) SURFACE WATER MONITORING LOCATION, NUMBER, AND WATER ELEVATION
  - 610 WATER TABLE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
  - DIRECTION OF WATER TABLE FLOW
  - DIRECTION OF FLOW IN PRAIRIE CREEK
  - GROUNDWATER MANAGEMENT ZONE BOUNDARY

- NOTES**
- BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
  - COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
  - WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 11 AND 12, 2012.
  - MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
  - MW171 IS A SHALLOW BEDROCK MONITORING WELL USED AS A HORIZONTAL CONTROL POINT.



|                               |  |                         |  |
|-------------------------------|--|-------------------------|--|
| RJR DEVELOPED BY              |  | DLF DRAWN BY            |  |
| APPROVED BY                   |  | DATE                    |  |
| 12/18/12                      |  | 12/18/12                |  |
| CONTRACT NO. W91ZLK-05-D-0012 |  | DELIVERY ORDER NO. 0001 |  |

VERIFY SCALE

0 1 1/2

BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 300'

DESCRIPTION

BY

DATE

REV

SITE FEATURES/WATER TABLE MAP - LAP AREA, SITE L1 (APRIL 2012)

2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT JOLIET ARMY AMMUNITION PLANT WILL COUNTY, ILLINOIS

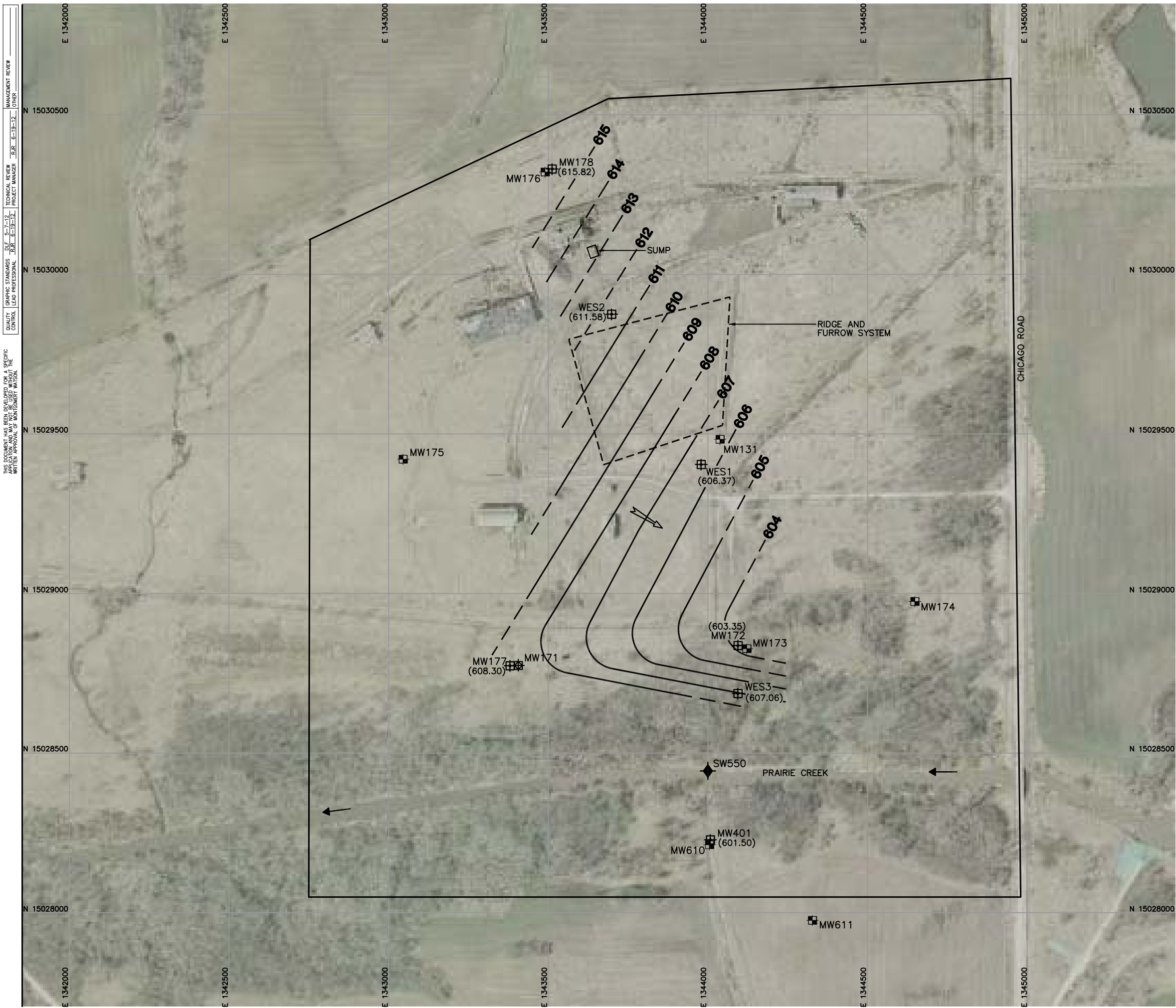
PRINTED 12/18/2012

**FIGURE 3-1**

DRAWING NUMBER 2091115 05010401

USAEC

**TOLTEST, INC.**



LEGEND

- MW176 OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW171 SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
- MW178 (615.82) DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- SW550 SURFACE WATER MONITORING LOCATION AND NUMBER
- 608 POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

- BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://terraserwer-usa.com), DATED APRIL 10, 2002.
- COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
- WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 11 AND 12, 2012.
- MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.

|                                     |  |                               |  |                         |  |
|-------------------------------------|--|-------------------------------|--|-------------------------|--|
| VERIFY SCALE                        |  | R.R.                          |  | D.L.F.                  |  |
| 0 1/2 1                             |  | DEVELOPED BY                  |  | DRAWN BY                |  |
| BAR REPRESENTS ONE INCH ON ORIGINAL |  | APPROVED BY                   |  | DATE                    |  |
| SCALE 1" = 300'                     |  | CONTRACT NO. W91ZLK-05-D-0012 |  | DELIVERY ORDER NO. 0001 |  |

|   |    |      |     |
|---|----|------|-----|
| DESCRIPTION   | BY | DATE | REV |
| POTENTIOMETRIC SURFACE MAP - LAP AREA, SITE L1 (APRIL 2012) |    |      |     |

2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT  
JOLIET ARMY AMMUNITION PLANT  
WILL COUNTY, ILLINOIS

PRINTED  
12/18/2012

FIGURE 3-2

DRAWING NUMBER  
2091115  
05010401

USAEC  
U.S. ARMY ENVIRONMENTAL CENTER  
JOLIET, ILLINOIS

TOLTEST, INC.





LEGEND

- MW134 (606.48) OVERBURDEN MONITORING WELL LOCATION, NUMBER AND WATER TABLE ELEVATION
- MW136 (594.48) COMBINED MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW630 SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
- MW412 DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- SW557 (587.96) SURFACE WATER MONITORING LOCATION, NUMBER, AND WATER ELEVATION
- 600 WATER TABLE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM A PLAT OF TOPOGRAPHY PREPARED BY GEOTECH INC., CREST HILL, ILLINOIS, DATED MARCH 9, 2007, AND AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 10 AND 11, 2012.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM SITE L3 CLOSURE REPORT, PREPARED BY MWH, DATED JUNE 25, 2010.
6. MW136 IS A COMBINATION OVERBURDEN/BEDROCK WELL USED AS A HORIZONTAL CONTROL POINT.
7. MW134 IS A SITE L2 MONITORING WELL USED AS A HORIZONTAL CONTROL POINT DUE TO ITS PROXIMITY TO SITE L3/LANDFILL L3.

|                               |  |                         |  |
|-------------------------------|--|-------------------------|--|
| RJR DEVELOPED BY              |  | DWF DRAWN BY            |  |
| APPROVED BY                   |  | DATE                    |  |
| 12/18/12                      |  | 12/18/12                |  |
| CONTRACT NO. W91ZLK-05-D-0012 |  | DELIVERY ORDER NO. 0001 |  |

|              |                                     |
|--------------|-------------------------------------|
| VERIFY SCALE | 1" = 200'                           |
| 0 1/2 1      | BAR REPRESENTS ONE INCH ON ORIGINAL |

|             |    |      |     |
|-------------|----|------|-----|
| DESCRIPTION | BY | DATE | REV |
|             |    |      |     |

|   |  |
|---|--|
| SITE FEATURES/WATER TABLE MAP - LAP AREA, SITE L3/LANDFILL L3 (APRIL 2012)                        |  |
| 2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT JOLIET ARMY AMMUNITION PLANT WILL COUNTY, ILLINOIS |  |
| PRINTED 12/18/2012  |  |
| FIGURE 3-4  |  |
| DRAWING NUMBER 2091115 05010401   |  |
|   |  |
|   |  |

THIS DOCUMENT HAS BEEN DEVELOPED FOR A SPECIFIC PROJECT AND IS NOT TO BE USED FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN APPROVAL OF MONITORING WATSON.

QUALITY CONTROL  
LEAD PROFESSIONAL  
GRAPHIC STANDARDS  
DWF 5-10-12  
RJR 6-13-12  
TECHNICAL REVIEW  
PROJECT MANAGER  
MANAGEMENT REVIEW  
OTHER



#### LEGEND

- MW134** OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW136 (594.48)** COMBINED MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- MW630 (588.33)** SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- MW412 (592.66)** DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- SW777** SURFACE WATER MONITORING LOCATION AND NUMBER
- 595** POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- APPROXIMATE LIMITS OF LANDFILL

#### NOTES

1. BASE MAP DEVELOPED FROM A PLAT OF TOPOGRAPHY PREPARED BY GEOTECH INC., CREST HILL, ILLINOIS, DATED MARCH 9, 2007, AND AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 11, 2012.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM SITE L3 CLOSURE REPORT, PREPARED BY MWH, DATED JUNE 25, 2010.
6. MW411 AND MW136 ARE COMBINATION OVERBURDEN/BEDROCK WELLS USED FOR HORIZONTAL CONTROL POINTS.

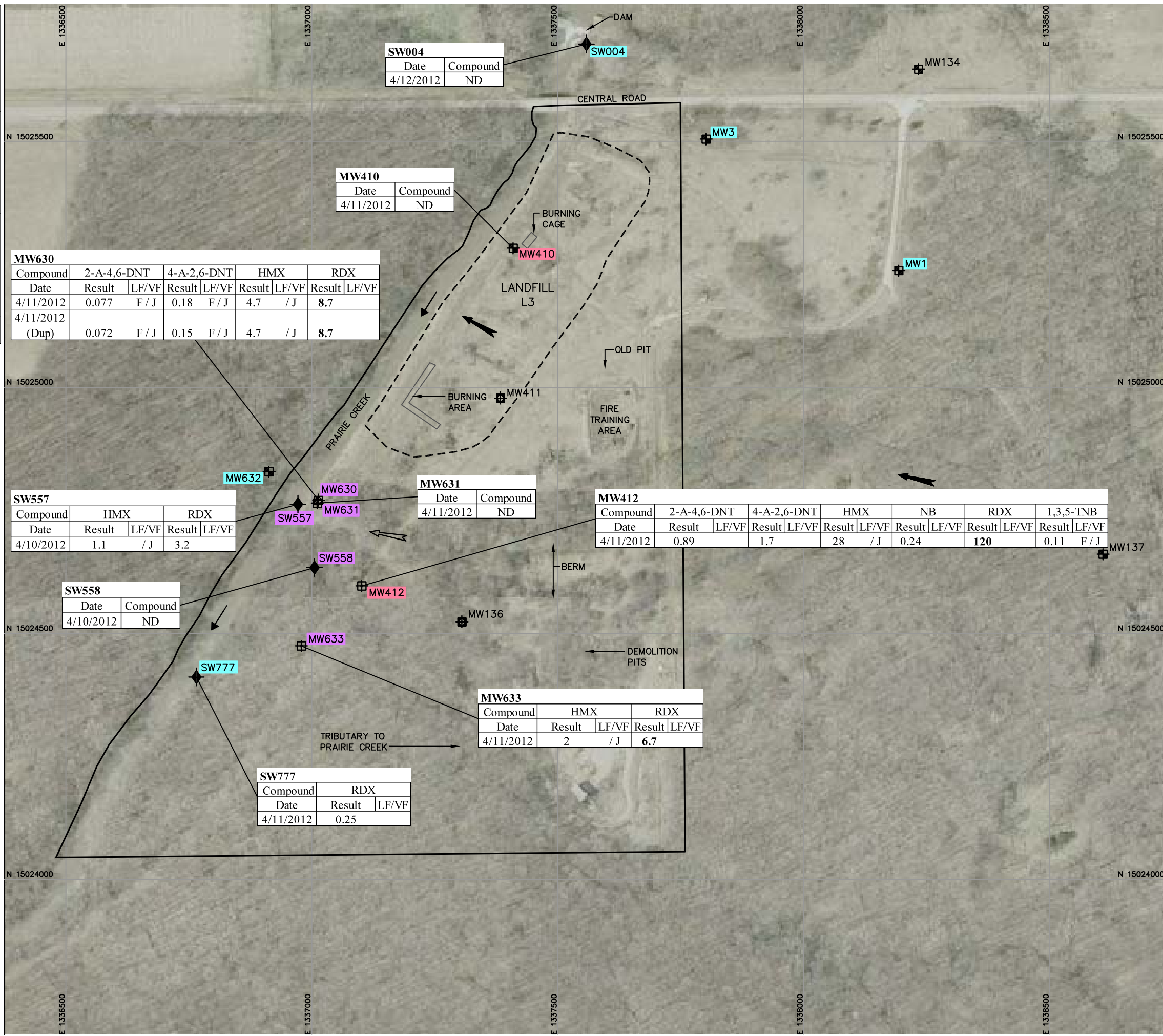


|                               |  |                         |  |
|-------------------------------|--|-------------------------|--|
| RJR DEVELOPED BY              |  | DWF DRAWN BY            |  |
| 12/18/12 DATE                 |  | 12/18/12 DATE           |  |
| APPROVED BY                   |  | APPROVED BY             |  |
| CONTRACT NO. W91ZLK-05-D-0012 |  | DELIVERY ORDER NO. 0001 |  |

|              |                                     |
|--------------|-------------------------------------|
| VERIFY SCALE | 1" = 200'                           |
| 0 1/2 1      | BAR REPRESENTS ONE INCH ON ORIGINAL |

|             |    |      |     |
|-------------|----|------|-----|
| DESCRIPTION | BY | DATE | REV |
|             |    |      |     |

|   |
|---|
| POTENTIOMETRIC SURFACE MAP - LAP AREA, SITE L3/LANDFILL L3 (APRIL 2012)                           |
| 2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT JOLIET ARMY AMMUNITION PLANT WILL COUNTY, ILLINOIS |
| PRINTED 12/18/2012  |
| FIGURE 3-5  |
| DRAWING NUMBER 2091115 05010401   |
|   |
|   |



**LEGEND**

**MW410** OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS

**MW411** COMBINED MONITORING WELL LOCATION AND NUMBER

**MW630** SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS

**MW412** DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS

**SW777** SURFACE WATER MONITORING LOCATION, NUMBER, AND EXPLSOIVES DETECTIONS

**IN-PLUME/DOWNGRADIENT MONITORING POINT**

**EARLY WARNING/DOWNGRADIENT MONITORING POINT**

**COMPLIANCE/DOWNGRADIENT AND UPGRADIENT MONITORING POINT**

**DIRECTION OF WATER TABLE FLOW**

**DIRECTION OF BEDROCK FLOW**

**DIRECTION OF FLOW IN PRAIRIE CREEK**

**GROUNDWATER MANAGEMENT ZONE BOUNDARY**

**APPROXIMATE LIMITS OF LANDFILL**

1,3,5-TNB 1,3,5-TRINITROBENZENE

2-A-4,6-DNT 2-AMINO-4,6-DINITROTOLUENE

4-A-2,6-DNT 4-AMINO-2,6-DINITROTOLUENE

NB NITROBENZENE

HMX HIGH MELTING EXPLOSIVE

RDX ROYAL DEMOLITION EXPLOSIVE

DUP DUPLICATE

F/ CONCENTRATION BELOW THE REPORTED DETECTION LIMIT

/J ESTIMATED CONCENTRATION

LF/VF LAB FLAG/VALIDATION FLAG

ND NOT DETECTED

NS NO STANDARD

RG REMEDIATION GOAL

| Compound    | Project Action Limit <sup>(1)</sup> | Surface Water RG |
|-------------|-------------------------------------|------------------|
| 2-A-4,6-DNT | NS                                  | NS               |
| 4-A-2,6-DNT | NS                                  | NS               |
| HMX         | 5100                                | 260              |
| RDX         | 2.6                                 | 500              |
| 1,3,5-TNB   | 5.1                                 | 15               |
| NB          | 51                                  | 8000             |

- NOTES**
1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
  2. BASE MAP DEVELOPED FROM A PLAT OF TOPOGRAPHY PREPARED BY GEOTECH INC., CREST HILL, ILLINOIS, DATED MARCH 9, 2007, AND AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
  3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
  4. SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN APRIL 2012.
  5. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
  6. BOLDLED VALUE INDICATES RG EXCEEDANCE.
  7. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM SITE L3 CLOSURE REPORT, PREPARED BY MWH, DATED JUNE 25, 2010.



EXPLOSIVES DETECTIONS - LAP AREA, SITE L3/LANDFILL L3 (APRIL 2012)

2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT

JOLIET ARMY AMMUNITION PLANT

WILL COUNTY, ILLINOIS

PRINTED 12/18/2012

**FIGURE 3-6**

DRAWING NUMBER 2091115 05010401

USACE U.S. ARMY ENVIRONMENTAL COMMAND

**TOLTEST, INC.**

DEVELOPED BY R.R. DRAWN BY DATE 12/18/12

APPROVED BY *R. R. Watson* CONTRACT NO. W91ZLK-05-D-0012 DELIVERY ORDER NO. 0001

VERIFY SCALE 1" = 200'

SCALE 1" = 200'

DESCRIPTION

BY

DATE

REV



LEGEND

- MW104 (543.05) OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW105 (548.99) COMBINED MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW201 DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- SW709 (532.71) SURFACE WATER MONITORING LOCATION, NUMBER, AND WATER TABLE ELEVATION
- 540 WATER TABLE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

- BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://terraserwer-usa.com), DATED APRIL 10, 2002.
- COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
- WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 12 AND 13, 2012.
- MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
- MW105 AND MW107 ARE COMBINATION OVERBURDEN/BEDROCK WELLS USED AS HORIZONTAL CONTROL POINTS.



|                               |  |                         |  |
|-------------------------------|--|-------------------------|--|
| R/R DEVELOPED BY              |  | D/LF DRAWN BY           |  |
| 12/18/12                      |  | 12/18/12                |  |
| APPROVED BY                   |  | DATE                    |  |
| CONTRACT NO. W91ZLK-05-D-0012 |  | DELIVERY ORDER NO. 0001 |  |

|              |                                     |
|--------------|-------------------------------------|
| VERIFY SCALE | 1" = 300'                           |
| 0 1/2 1      | BAR REPRESENTS ONE INCH ON ORIGINAL |

|             |     |      |    |
|-------------|-----|------|----|
| DESCRIPTION | REV | DATE | BY |
|             |     |      |    |

SITE FEATURES/WATER TABLE MAP -  
MANUFACTURING AREA, SITE M1 (APRIL 2012)

2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT  
JOLIET ARMY AMMUNITION PLANT  
WILL COUNTY, ILLINOIS

PRINTED  
12/18/2012

FIGURE 3-7

DRAWING NUMBER  
2091115  
05010401



**LEGEND**

- MW104 OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW105 COMBINED MONITORING WELL LOCATION AND NUMBER
- MW640 (544.17) DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- SW709 SURFACE WATER MONITORING LOCATION AND NUMBER
- 540 POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

- NOTES**
1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
  2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
  3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 12 AND 13, 2012.
  4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.



|                               |  |              |  |
|-------------------------------|--|--------------|--|
| R/R DEVELOPED BY              |  | DLF DRAWN BY |  |
| APPROVED BY                   |  | DATE         |  |
| 12/18/12                      |  | 12/18/12     |  |
| CONTRACT NO. W91ZLK-05-D-0012 |  |              |  |
| DELIVERY ORDER NO. 0001       |  |              |  |

|              |         |                                     |                 |
|--------------|---------|-------------------------------------|-----------------|
| VERIFY SCALE | 0 1 1/2 | BAR REPRESENTS ONE INCH ON ORIGINAL | SCALE 1" = 300' |
|              |         |                                     |                 |

| REV | DATE | BY | DESCRIPTION |
|-----|------|----|-------------|
|     |      |    |             |

POTENITOMETRIC SURFACE MAP - (APRIL 2012)

MANUFACTURING AREA, SITE M1

2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT


JOLIET ARMY AMMUNITION PLANT


WILL COUNTY, ILLINOIS

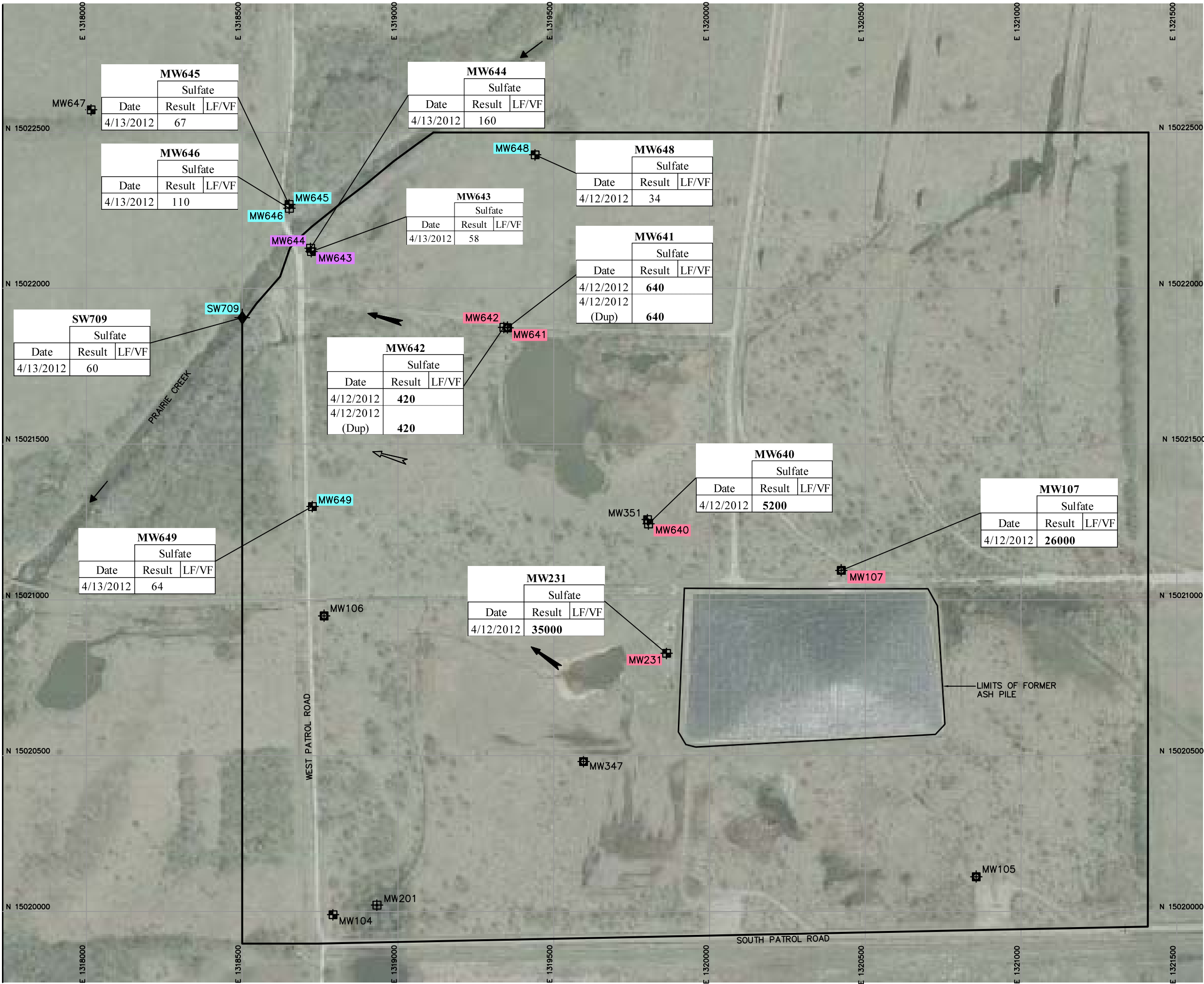
PRINTED 12/18/2012

**FIGURE 3-8**

DRAWING NUMBER 2091115 05010401







**LEGEND**

- MW648 OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND SULFATE DETECTIONS
- MW641 COMBINED MONITORING WELL LOCATION, NUMBER, AND SULFATE DETECTIONS
- MW642 DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND SULFATE DETECTIONS
- SW709 SURFACE WATER MONITORING LOCATION, NUMBER, AND SULFATE DETECTIONS
- IN-PLUME MONITORING POINT
- EARLY WARNING MONITORING POINT
- COMPLIANCE MONITORING POINT
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- DUP DUPLICATE
- LF/VF LAB FLAG/VALIDATION FLAG
- mg/L MILLIGRAMS PER LITER
- NS NO STANDARD
- RG REMEDIATION GOAL

|                                     | Sulfate |
|-------------------------------------|---------|
| Units                               | mg/L    |
| Project Action Limit <sup>(1)</sup> | 400     |
| Surface Water RG                    | NS      |

- NOTES**
- REMEDATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
  - BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
  - COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
  - SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN APRIL 2012.
  - CONCENTRATIONS REPORTED IN MILLIGRAMS PER LITER (mg/L).
  - BOLDED VALUE INDICATES RG EXCEEDANCE.



|                               |              |                         |             |
|-------------------------------|--------------|-------------------------|-------------|
| D.L.F.                        | DRAWN BY     | 12/18/12                | DATE        |
| R.R.                          | DEVELOPED BY | <i>R. R. R.</i>         | APPROVED BY |
| CONTRACT NO. W91ZLK-05-D-0012 |              | DELIVERY ORDER NO. 0001 |             |

VERIFY SCALE

0 1 1/2

BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 300'

DESCRIPTION

|     |      |    |             |
|-----|------|----|-------------|
| REV | DATE | BY | DESCRIPTION |
|     |      |    |             |
|     |      |    |             |

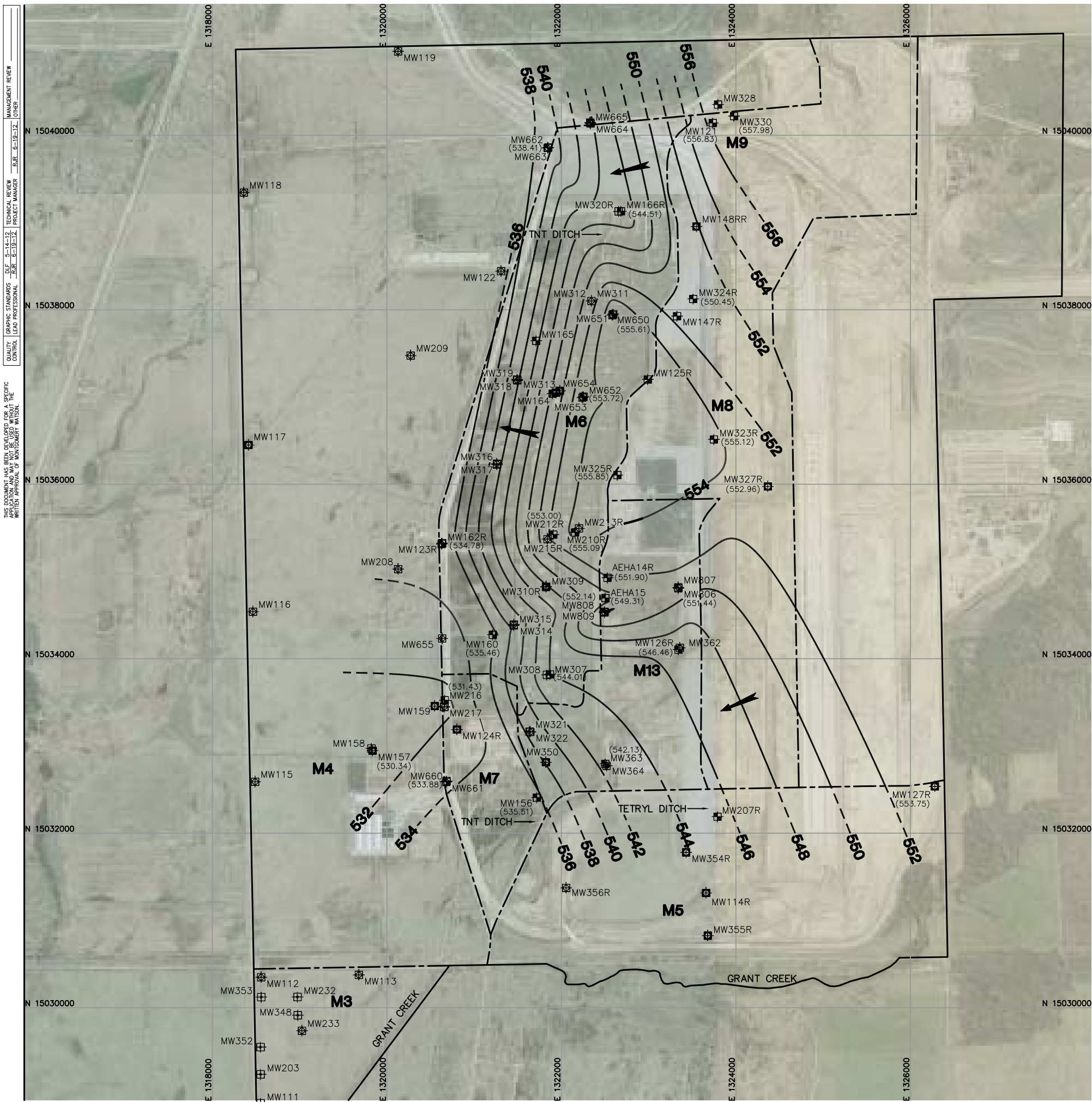
SULFATE DETECTIONS – MANUFACTURING AREA, SITE M1 (APRIL 2012)

2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT  
JOLIET ARMY AMMUNITION PLANT  
WILL COUNTY, ILLINOIS

PRINTED 12/18/2012

**FIGURE 3-9**

DRAWING NUMBER 2091115 05010401



LEGEND

- MW325R (555.85) OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW652 (553.72) COMBINED MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW356 SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
- MW308 DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- (NM) NOT MEASURED
- 550 WATER TABLE CONTOUR (CONTOUR INTERVAL: 2', DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- STUDY AREA BOUNDARIES

NOTES

- BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://terraserwer-usa.com), DATED APRIL 10, 2002.
- COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
- WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL APRIL 13, 16, AND 17, 2012.
- MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
- MW117, MW127R, AND MW327R ARE COMBINATION OVERBURDEN/BEDROCK WELLS USED AS HORIZONTAL CONTROL POINTS.

|                               |  |                         |  |
|-------------------------------|--|-------------------------|--|
| R.R. DEVELOPED BY             |  | D.L.F. DRAWN BY         |  |
| APPROVED BY                   |  | DATE                    |  |
| 12/18/12                      |  | 12/18/12                |  |
| CONTRACT NO. W91ZLK-05-D-0012 |  | DELIVERY ORDER NO. 0001 |  |

|                                     |         |
|-------------------------------------|---------|
| VERIFY SCALE                        | 0 1/2 1 |
| BAR REPRESENTS ONE INCH ON ORIGINAL |         |
| SCALE 1" = 1200'                    |         |

|   |    |      |     |
|---|----|------|-----|
| DESCRIPTION   | BY | DATE | REV |
| SITE FEATURES/WATER TABLE MAP - MANUFACTURING AREA, MFG - SITES M4, M5, M6, M7, M8, M9, M13, AND OTHER AREAS (APRIL 2012) |    |      |     |
|   |    |      |     |
|   |    |      |     |
|   |    |      |     |

2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT  
JOLIET ARMY AMMUNITION PLANT  
WILL COUNTY, ILLINOIS

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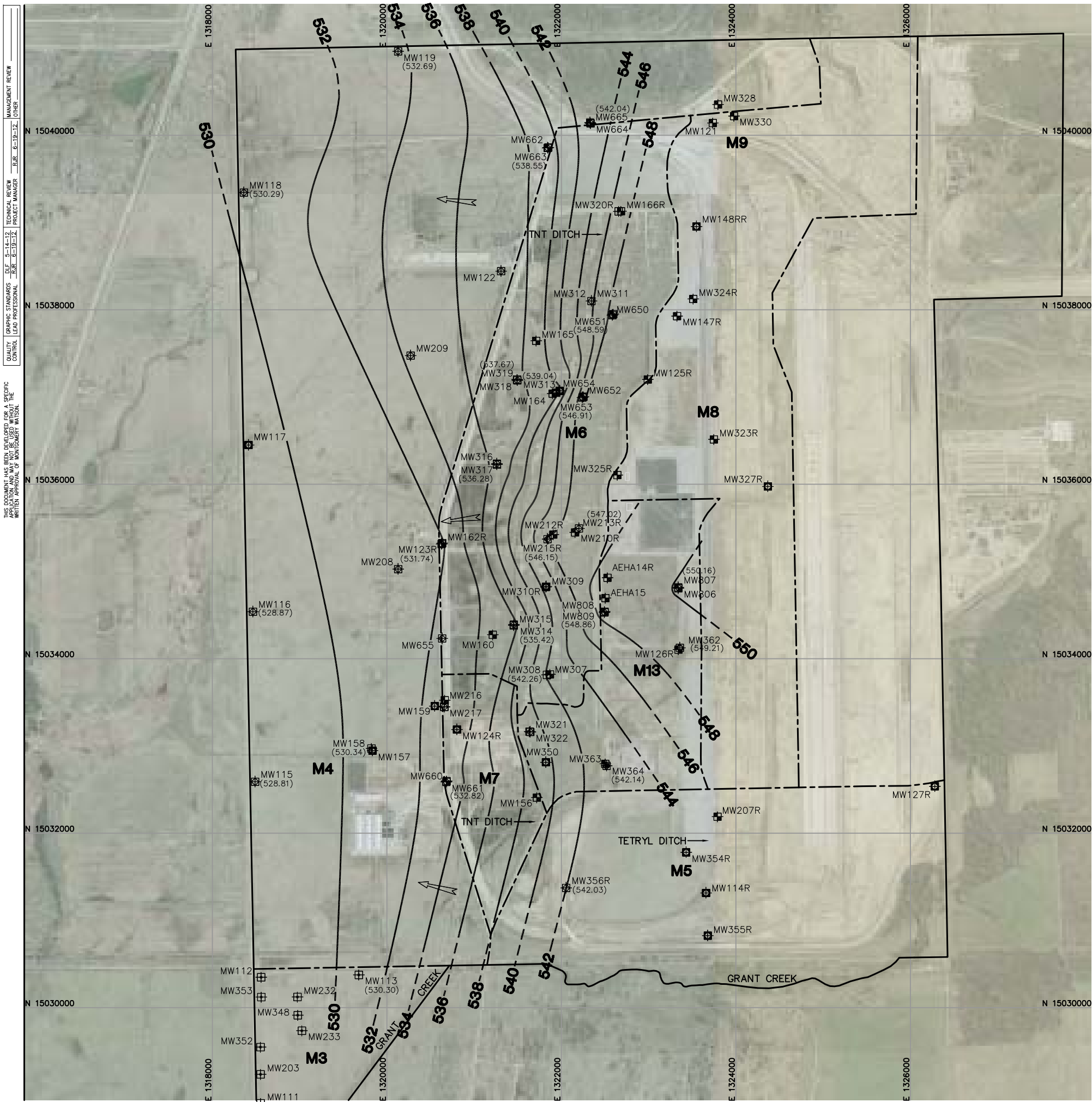
FIGURE 3-10

DRAWING NUMBER  
2091115  
05010401

USAEC  
U.S. ARMY ENVIRONMENTAL CENTER

TOLTEST, INC.





LEGEND

- MW325R OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW350 COMBINED MONITORING WELL LOCATION AND NUMBER
- MW356R (542.03) SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- MW308 (542.26) DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- (NM) NOT MEASURED
- 540 POTENTIOMETRIC SURFACE CONTOUR ( CONTOUR INTERVAL: 2 FT, DASHED WHERE INFERRED)
- Direction of bedrock flow
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- STUDY AREA BOUNDARIES

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://terraserwer-usa.com), DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL APRIL 13, 16, AND 17, 2012.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.

REV

DATE

BY

DESCRIPTION

VERIFIED SCALE

0 1/2 1

BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 1200'

R.R.

DEVELOPED BY

DATE

12/18/12

APPROVED BY

CONTRACT NO. W91ZLK-05-D-0012

DELIVERY ORDER NO. 0001

POTENTIOMETRIC SURFACE MAP - MANUFACTURING AREA, MFG - SITES M3, M4, M5, M6, M7, M8, M9, M13, AND OTHER AREAS (APRIL 2012)

2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT

JOLIET ARMY AMMUNITION PLANT

WILL COUNTY, ILLINOIS

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12/19/2012

FIGURE 3-11

DRAWING NUMBER

2091115

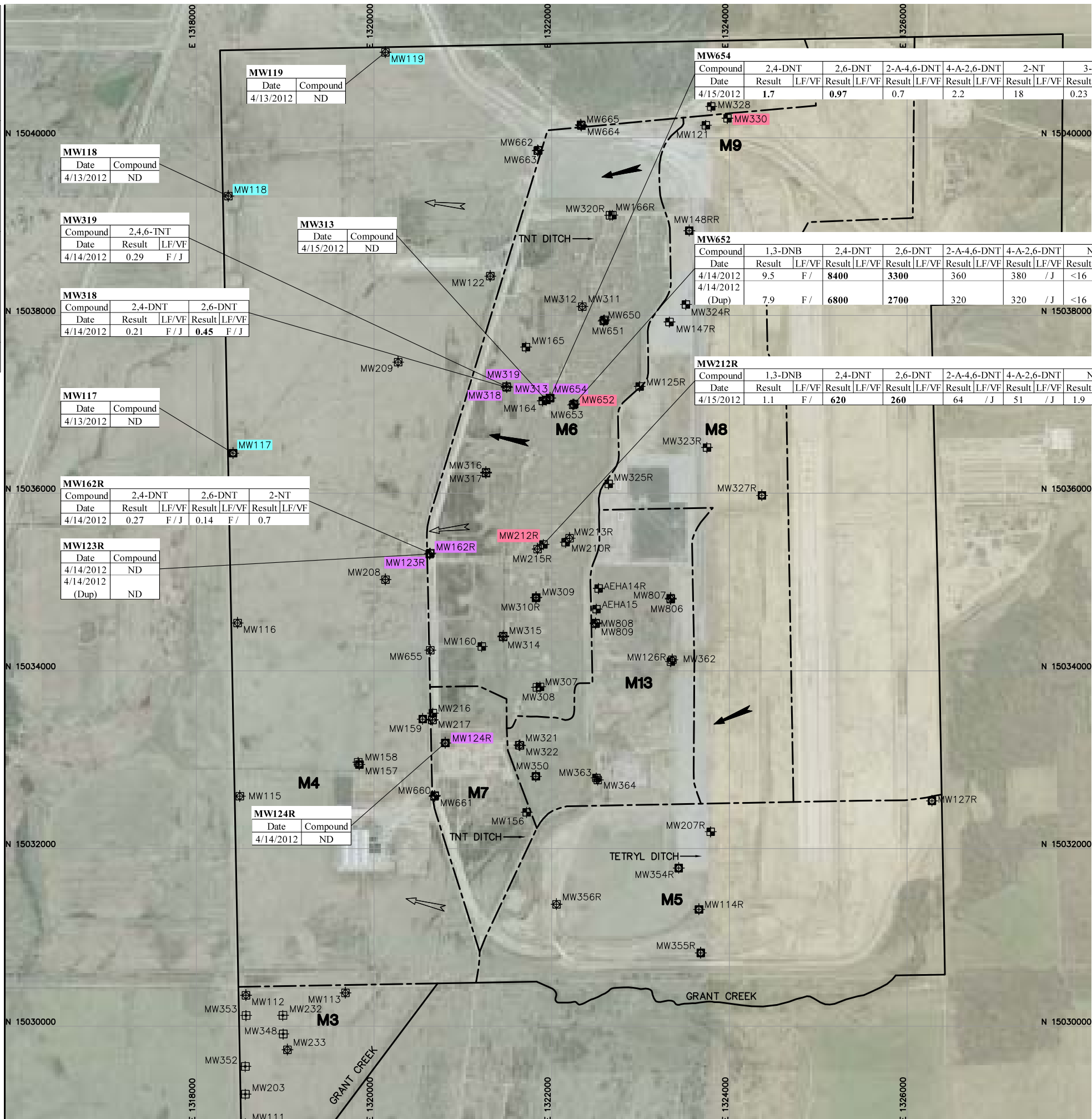
05010401

USAEC

U.S. ARMY ENVIRONMENTAL CENTER

TOLTEST, INC.





| MW119     |          |
|-----------|----------|
| Date      | Compound |
| 4/13/2012 | ND       |

| MW118     |          |
|-----------|----------|
| Date      | Compound |
| 4/13/2012 | ND       |

| MW319     |           |       |
|-----------|-----------|-------|
| Compound  | 2,4,6-TNT |       |
| Date      | Result    | LF/VF |
| 4/14/2012 | 0.29      | F / J |

| MW318     |         |       |             |       |
|-----------|---------|-------|-------------|-------|
| Compound  | 2,4-DNT |       | 2,6-DNT     |       |
| Date      | Result  | LF/VF | Result      | LF/VF |
| 4/14/2012 | 0.21    | F / J | <b>0.45</b> | F / J |

| MW117     |          |
|-----------|----------|
| Date      | Compound |
| 4/13/2012 | ND       |

| MW162R    |         |       |         |       |        |       |
|-----------|---------|-------|---------|-------|--------|-------|
| Compound  | 2,4-DNT |       | 2,6-DNT |       | 2-NT   |       |
| Date      | Result  | LF/VF | Result  | LF/VF | Result | LF/VF |
| 4/14/2012 | 0.27    | F / J | 0.14    | F /   | 0.7    |       |

| MW123R          |          |
|-----------------|----------|
| Date            | Compound |
| 4/14/2012       | ND       |
| 4/14/2012 (Dup) | ND       |

| MW124R    |          |
|-----------|----------|
| Date      | Compound |
| 4/14/2012 | ND       |

| MW654    |           | 2,4-DNT |       | 2,6-DNT     |       | 2-A-4,6-DNT |       | 4-A-2,6-DNT |       | 2-NT   |       | 3-NT   |       | 4-NT   |       | RDX    |       | 2,4,6-TNT |       |
|----------|-----------|---------|-------|-------------|-------|-------------|-------|-------------|-------|--------|-------|--------|-------|--------|-------|--------|-------|-----------|-------|
| Compound | Date      | Result  | LF/VF | Result      | LF/VF | Result      | LF/VF | Result      | LF/VF | Result | LF/VF | Result | LF/VF | Result | LF/VF | Result | LF/VF | Result    | LF/VF |
|          | 4/15/2012 | 1.7     |       | <b>0.97</b> |       | 0.7         |       | 2.2         |       | 18     |       | 0.23   | F / J | 11     |       | 0.31   | / J   | 0.18      | / J   |

| MW652    |                 | 1,3-DNB |       | 2,4-DNT     |       | 2,6-DNT     |       | 2-A-4,6-DNT |       | 4-A-2,6-DNT |       | NB     |       | 2-NT         |       | 4-NT   |       | 2,4,6-TNT   |       |
|----------|-----------------|---------|-------|-------------|-------|-------------|-------|-------------|-------|-------------|-------|--------|-------|--------------|-------|--------|-------|-------------|-------|
| Compound | Date            | Result  | LF/VF | Result      | LF/VF | Result      | LF/VF | Result      | LF/VF | Result      | LF/VF | Result | LF/VF | Result       | LF/VF | Result | LF/VF | Result      | LF/VF |
|          | 4/14/2012       | 9.5     | F /   | <b>8400</b> |       | <b>3300</b> |       | 360         |       | 380         | / J   | <16    |       | <b>44000</b> |       | 28000  |       | <b>1600</b> |       |
|          | 4/14/2012 (Dup) | 7.9     | F /   | <b>6800</b> |       | <b>2700</b> |       | 320         |       | 320         | / J   | <16    |       | <b>35000</b> |       | 22000  | / J   | <b>1300</b> |       |

| MW212R   |           | 1,3-DNB |       | 2,4-DNT    |       | 2,6-DNT    |       | 2-A-4,6-DNT |       | 4-A-2,6-DNT |       | NB     |       | 2-NT   |       | 4-NT   |       | 2,4,6-TNT |       |
|----------|-----------|---------|-------|------------|-------|------------|-------|-------------|-------|-------------|-------|--------|-------|--------|-------|--------|-------|-----------|-------|
| Compound | Date      | Result  | LF/VF | Result     | LF/VF | Result     | LF/VF | Result      | LF/VF | Result      | LF/VF | Result | LF/VF | Result | LF/VF | Result | LF/VF | Result    | LF/VF |
|          | 4/15/2012 | 1.1     | F /   | <b>620</b> |       | <b>260</b> |       | 64          | / J   | 51          | / J   | 1.9    |       | 4100   |       | 2100   |       | <b>39</b> |       |

- LEGEND
- MW212R OVERBURDEN MONITORING WELL LOCATION NUMBER, AND EXPLOSIVES DETECTIONS
  - MW124R COMBINED MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
  - MW115 SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
  - MW308 DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
  - IN-PLUME MONITORING POINT
  - EARLY WARNING MONITORING POINT
  - COMPLIANCE MONITORING POINT
  - DIRECTION OF WATER TABLE FLOW
  - DIRECTION OF BEDROCK FLOW
  - GROUNDWATER MANAGEMENT ZONE BOUNDARY
  - STUDY AREA BOUNDARIES
  - RESULT SHOWS LAB LIMIT FOR NON-DETECTED RESULTS
  - 1,3-DNB 1,3-DINITROBENZENE
  - 2,4,6-TNT 2,4,6-TRINITROTOLUENE
  - 2,4-DNT 2,4-DINITROTOLUENE
  - 2,6-DNT 2,6-DINITROTOLUENE
  - 2-A-4,6-DNT 2-AMINO-4,6-DINITROTOLUENE
  - 2-NT 2-NITROTOLUENE
  - 3-NT 3-NITROTOLUENE
  - 4-A-2,6-DNT 4-AMINO-2,6-DINITROTOLUENE
  - 4-NT 4-NITROTOLUENE
  - NB NITROBENZENE
  - RDX ROYAL DEMOLITION EXPLOSIVE
  - DUP DUPLICATE
  - F/ CONCENTRATION BELOW THE REPORTED DETECTION LIMIT
  - /J ESTIMATED CONCENTRATION
  - LF/VF LAB FLAG/VALIDATION FLAG
  - ND NOT DETECTED
  - NS NO STANDARD
  - RG REMEDIATION GOAL

| Compound    | Project Action Limit <sup>(1)</sup> | Surface Water RG |
|-------------|-------------------------------------|------------------|
| 1,3-DNB     | 10                                  | 4                |
| 2,4,6-TNT   | 9.5                                 | 75               |
| 2,4-DNT     | 0.42                                | 330              |
| 2,6-DNT     | 0.42                                | 150              |
| 2-A-4,6-DNT | NS                                  | NS               |
| 2-NT        | 5100                                | 62               |
| 3-NT        | NS                                  | NS               |
| 4-A-2,6-DNT | NS                                  | NS               |
| 4-NT        | NS                                  | NS               |
| NB          | 51                                  | 8000             |
| RDX         | 2.6                                 | 500              |

- NOTES
- REMEDATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
  - BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
  - COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
  - SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN APRIL 2012.
  - CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
  - BOLDED VALUE INDICATES RG EXCEEDANCE.



EXPLOSIVES DETECTIONS – MANUFACTURING AREA, MFG – SITES M6, M7, M9, AND OTHER AREAS (APRIL 2012)

2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT JOLIET ARMY AMMUNITION PLANT WILL COUNTY, ILLINOIS

PRINTED 12/19/2012

**FIGURE 3-12**

DRAWING NUMBER 2091115 05010401

RJR DEVELOPED BY

DLF DRAWN BY

12/18/12 DATE

APPROVED BY

CONTRACT NO. W91ZLK-05-D-0012

DELIVERY ORDER NO. 0001

THIS DOCUMENT HAS BEEN DEVELOPED FOR A SPECIFIC PROJECT AND IS NOT TO BE USED FOR ANY OTHER PROJECT WITHOUT THE WRITTEN APPROVAL OF MONITORING WATSON.

|                 |                   |                |                  |                   |
|-----------------|-------------------|----------------|------------------|-------------------|
| QUALITY CONTROL | GRAPHIC STANDARDS | DLF 5-14-12    | TECHNICAL REVIEW | MANAGEMENT REVIEW |
|                 | LEAD PROFESSIONAL | J.R.R. 6-19-12 | PROJECT MANAGER  | OTHER             |



LEGEND

- MW647 OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW802 (536.73) COMBINED MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW334 (532.81) SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- 530 — WATER TABLE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- - - STUDY AREA BOUNDARY
- . . . APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER—USA.COM](http://terraservertusa.com), DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 16, 2012.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M11 NEW WELL LOCATIONS", PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED JANUARY 2008.
6. MW334 AND MW335 ARE SHALLOW BEDROCK WELLS, AND MW802 AND MW804 ARE COMBINATION OVERBURDEN/BEDROCK WELLS USED AS HORIZONTAL CONTROL POINTS.



|                               |  |                         |  |
|-------------------------------|--|-------------------------|--|
| RJR DEVELOPED BY              |  | DLF DRAWN BY            |  |
|                               |  |                         |  |
| APPROVED BY                   |  | DATE                    |  |
| 12/18/12                      |  | 12/18/12                |  |
| CONTRACT NO. W91ZLK-05-D-0012 |  | DELIVERY ORDER NO. 0001 |  |

|                                     |         |
|-------------------------------------|---------|
| VERIFY SCALE                        | 0 1/2 1 |
| BAR REPRESENTS ONE INCH ON ORIGINAL |         |
| SCALE 1" = 500'                     |         |

|             |    |      |     |
|-------------|----|------|-----|
| DESCRIPTION | BY | DATE | REV |
|             |    |      |     |

SITE FEATURES/WATER TABLE MAP –  
MANUFACTURING AREA, SITE M11 LANDFILL (APRIL 2012)

2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT  
JOLIET ARMY AMMUNITION PLANT  
WILL COUNTY, ILLINOIS

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FIGURE 3-13

DRAWING NUMBER  
2091115  
05010401

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PROJECT AND IS NOT TO BE USED FOR ANY OTHER  
PROJECT WITHOUT THE WRITTEN APPROVAL OF MONITORING WATSON.

|                 |                   |                |                  |                 |                   |
|-----------------|-------------------|----------------|------------------|-----------------|-------------------|
| QUALITY CONTROL | GRAPHIC STANDARDS | DLF 5-14-12    | TECHNICAL REVIEW | PROJECT MANAGER | MANAGEMENT REVIEW |
|                 | LEAD PROFESSIONAL | J.R.R. 6-19-12 |                  |                 | OTHER             |



LEGEND

- MW647 OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW802 COMBINED MONITORING WELL LOCATION AND NUMBER
- MW803 SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- 535 POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- STUDY AREA BOUNDARY
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 16, 2012.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M11 NEW WELL LOCATIONS", PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED JANUARY 2008.

POTENTIOMETRIC SURFACE MAP –  
MANUFACTURING AREA, SITE M11 LANDFILL (APRIL 2012)  
2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT  
JOLIET ARMY AMMUNITION PLANT  
WILL COUNTY, ILLINOIS

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FIGURE 3-14

DRAWING NUMBER

2091115  
05010401

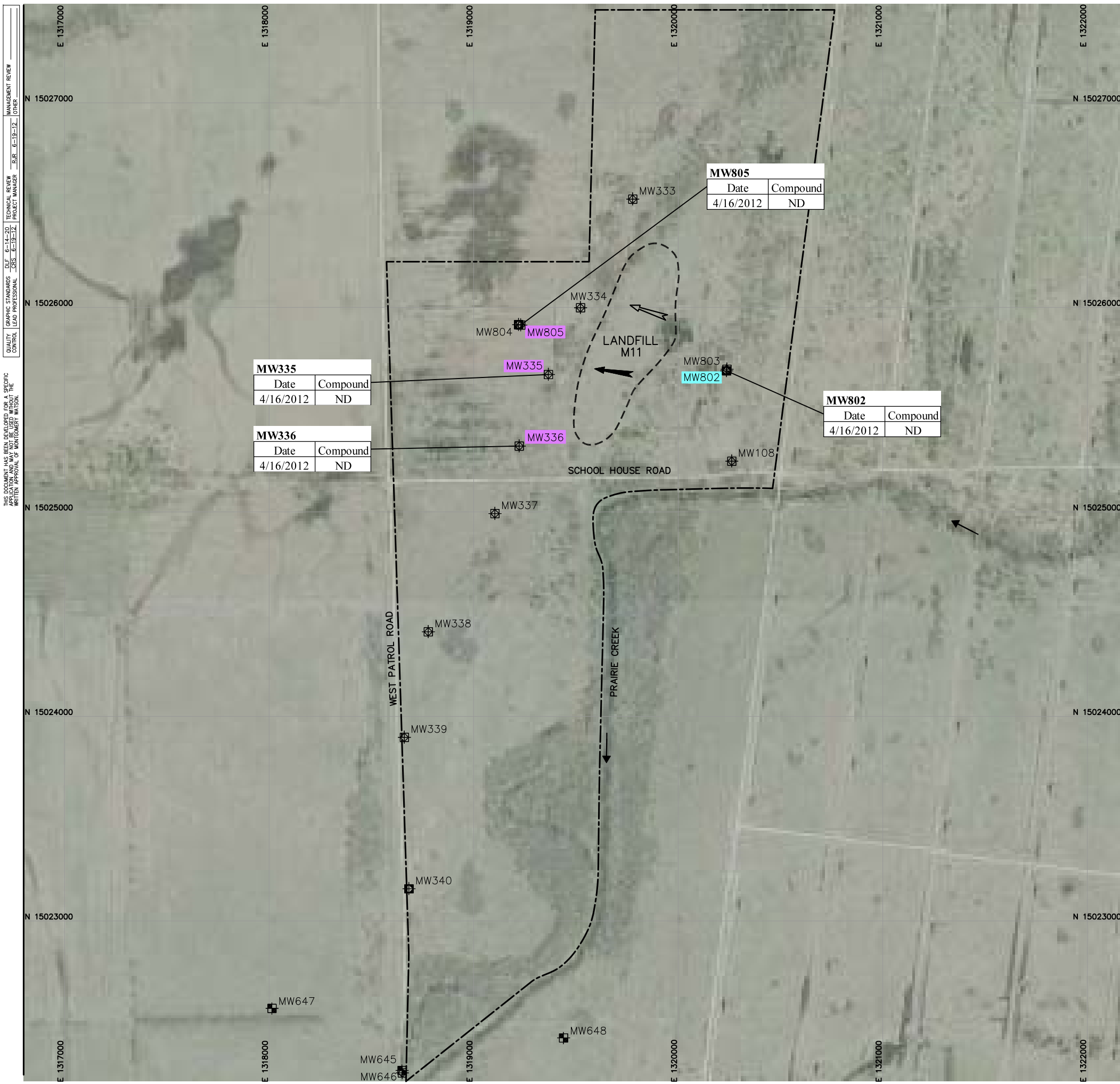


TOLTEST, INC.

|              |         |                                     |                 |
|--------------|---------|-------------------------------------|-----------------|
| VERIFY SCALE | 0 1/2 1 | BAR REPRESENTS ONE INCH ON ORIGINAL | SCALE 1" = 500' |
|              |         |                                     |                 |

|                               |                 |
|-------------------------------|-----------------|
| RJR                           | DLF             |
| DEVELOPED BY                  | DRAWN BY        |
| <i>R. J. R.</i>               | <i>R. J. R.</i> |
| APPROVED BY                   | DATE            |
|                               | 12/18/12        |
| CONTRACT NO. W91ZLK-05-D-0012 |                 |
| DELIVERY ORDER NO. 0001       |                 |





LEGEND

MW647 OVERBURDEN MONITORING WELL LOCATION AND NUMBER

MW802 COMBINED MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS

MW803 SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS

DOWNGRADIENT MONITORING POINT

UPGRADIENT MONITORING POINT

DIRECTION OF WATER TABLE FLOW

DIRECTION OF BEDROCK FLOW

DIRECTION OF FLOW IN PRAIRIE CREEK

STUDY AREA BOUNDARY

APPROXIMATE LIMITS OF LANDFILL

ND NOT DETECTED

- NOTES
1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
2. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
4. SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN APRIL 2012.
5. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
6. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M11 NEW WELL LOCATIONS", PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED JANUARY 2008.

|     |     |              |          |                    |                  |
|-----|-----|--------------|----------|--------------------|------------------|
| RJR | DLF | DEVELOPED BY | DRAWN BY | DATE               | 12/18/12         |
|     |     |              |          | APPROVED BY        |                  |
|     |     |              |          | CONTRACT NO.       | W91ZLK-05-D-0012 |
|     |     |              |          | DELIVERY ORDER NO. | 0001             |

|             |    |      |     |
|-------------|----|------|-----|
| DESCRIPTION | BY | DATE | REV |
|             |    |      |     |
|             |    |      |     |
|             |    |      |     |

EXPLOSIVES DETECTIONS - MANUFACTURING AREA, SITE M11 LANDFILL (APRIL 2012)

2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT

JOLIET ARMY AMMUNITION PLANT

WILL COUNTY, ILLINOIS

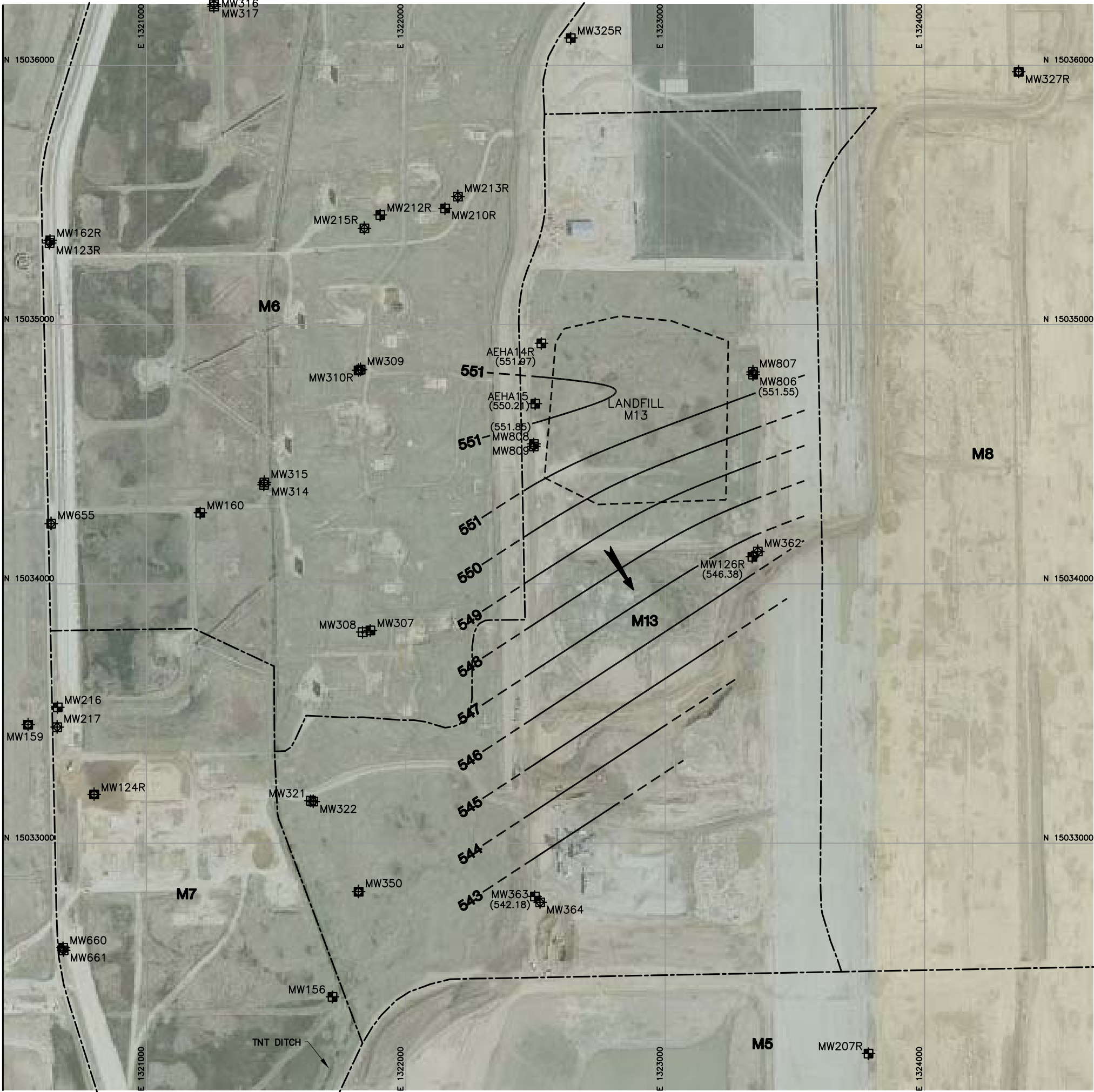
PRINTED 12/19/2012

FIGURE 3-15

DRAWING NUMBER 2091115 05010401

USACE

TOLTEST, INC.



LEGEND

- MW126R (546.38)
- MW350
- MW356
- MW308
- 550
- 
- 
- - - -

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://terraser.com), DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON FEBRUARY 29, 2012.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

|                               |  |                         |  |
|-------------------------------|--|-------------------------|--|
| RJR DEVELOPED BY              |  | DWF DRAWN BY            |  |
| APPROVED BY                   |  | DATE 12/18/12           |  |
| CONTRACT NO. W91ZLK-05-D-0012 |  | DELIVERY ORDER NO. 0001 |  |

|                                     |         |
|-------------------------------------|---------|
| VERIFY SCALE                        | 0 1/2 1 |
| BAR REPRESENTS ONE INCH ON ORIGINAL |         |
| SCALE 1" = 400'                     |         |

| REV | DATE | BY | DESCRIPTION |
|-----|------|----|-------------|
|     |      |    |             |
|     |      |    |             |
|     |      |    |             |

SITE FEATURES/WATER TABLE MAP -  
MANUFACTURING AREA, SITE M13 LANDFILL (FEBRUARY 2012)

2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT  
JOLIET ARMY AMMUNITION PLANT  
WILL COUNTY, ILLINOIS

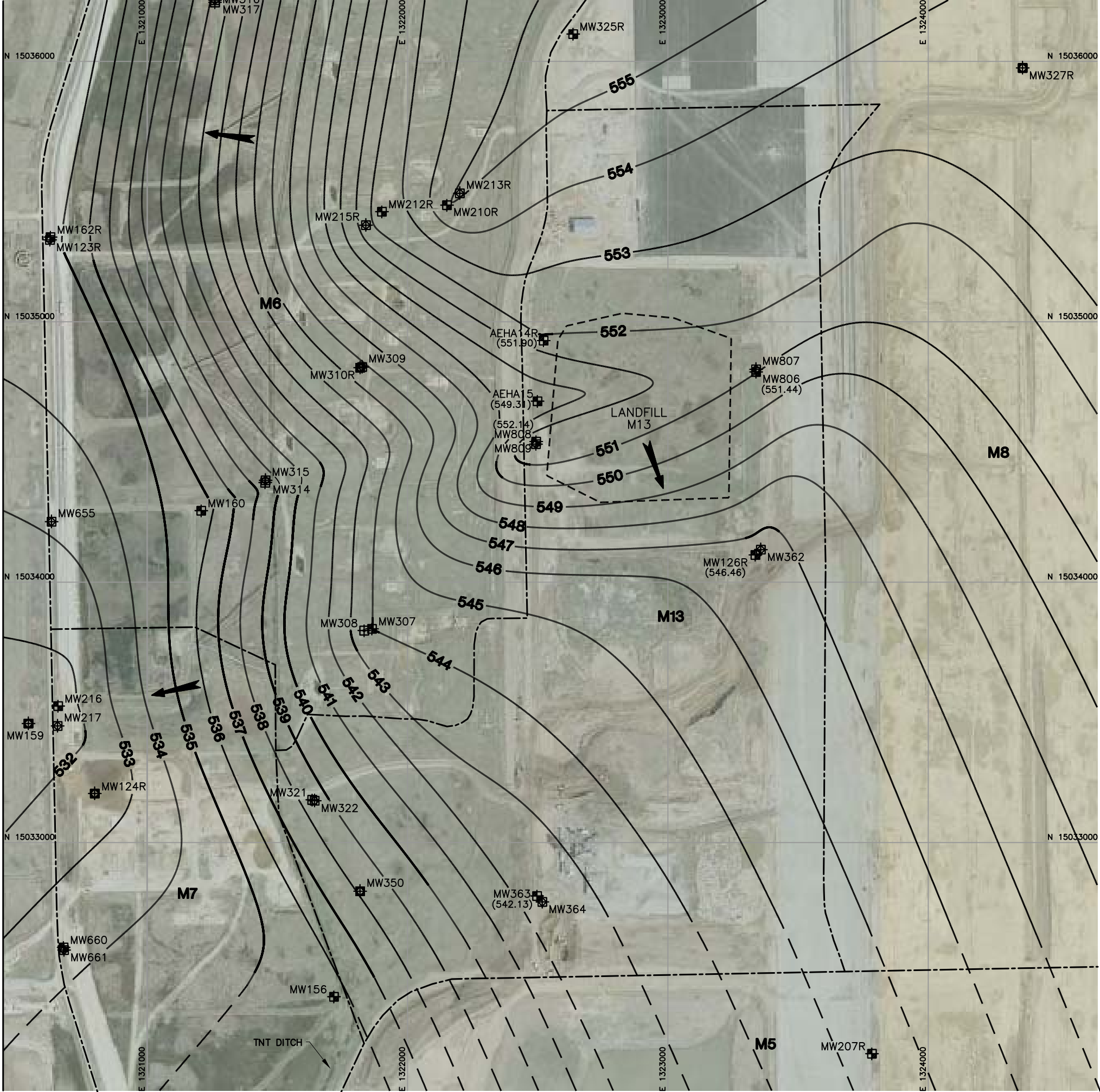
PRINTED  
12/19/2012

FIGURE 3-16

DRAWING NUMBER  
2091115  
05010401

U.S. ARMY ENVIRONMENTAL CENTER

TOLTEST, INC.



LEGEND

- MW126R (546.46) OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW350 COMBINED MONITORING WELL LOCATION AND NUMBER
- MW356 SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
- MW308 DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- 550 WATER TABLE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- STUDY AREA BOUNDARIES
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE: [HTTP://TERRASERVER-USA.COM](http://terraserwer-usa.com), DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON APRIL 16, 2012.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. SEE FIGURE 3-10 FOR GROUNDWATER ELEVATIONS OF MONITORING WELLS AT SITES ADJACENT TO M13.
6. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

|                               |  |                         |  |
|-------------------------------|--|-------------------------|--|
| RJR DEVELOPED BY              |  | DLF DRAWN BY            |  |
| 12/18/12 DATE                 |  | 12/18/12 DATE           |  |
| APPROVED BY                   |  | APPROVED BY             |  |
| CONTRACT NO. W91ZLK-05-D-0012 |  | DELIVERY ORDER NO. 0001 |  |

|              |                                     |
|--------------|-------------------------------------|
| VERIFY SCALE | 1" = 400'                           |
| 0 1/2 1      | BAR REPRESENTS ONE INCH ON ORIGINAL |

|             |    |      |     |
|-------------|----|------|-----|
| DESCRIPTION | BY | DATE | REV |
|             |    |      |     |
|             |    |      |     |
|             |    |      |     |

WATER TABLE MAP – MANUFACTURING AREA, SITE M13 LANDFILL (APRIL 2012)

2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT  
JOLIET ARMY AMMUNITION PLANT  
WILL COUNTY, ILLINOIS

PRINTED  
12/19/2012

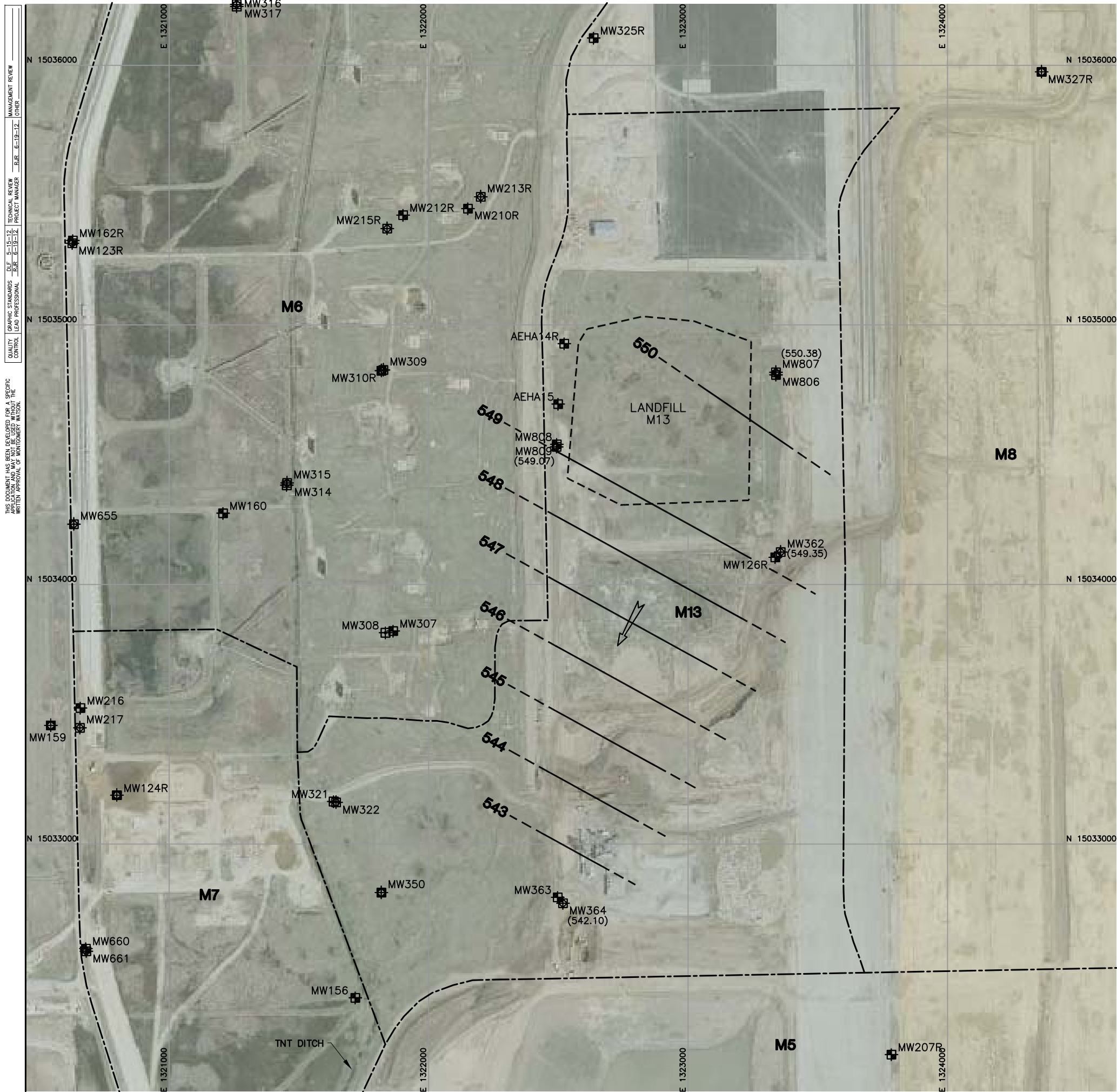
FIGURE 3-17









DRAWING NUMBER  
2091115  
05010401

U.S. ARMY ENVIRONMENTAL COMMAND

TOLTEST, INC.



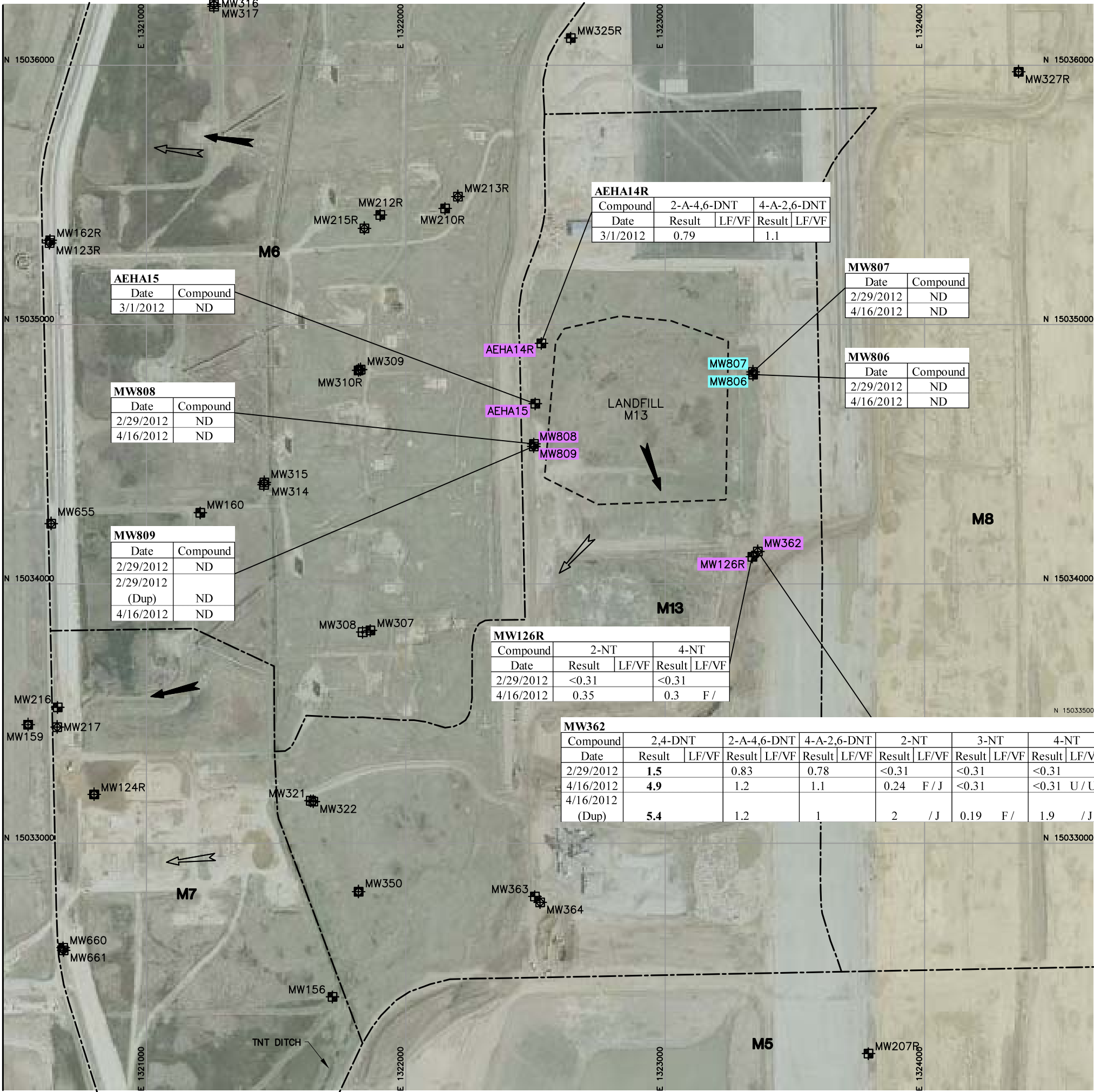


|  |  |
|--|--|
|  MW126R         | OVERBURDEN MONITORING WELL LOCATION AND NUMBER   |
|  MW350          | COMBINED MONITORING WELL LOCATION AND NUMBER   |
|  MW362 (549.35) | SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION |
|  MW308          | DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER                                     |
|  550            | POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)         |
|                 | DIRECTION OF BEDROCK FLOW  |
|                 | STUDY AREA BOUNDARIES  |
|                 | APPROXIMATE LIMITS OF LANDFILL   |

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. WATER LEVELS MEASURED BY TOLTEST/MWH PERSONNEL ON FEBRUARY 29, 2012.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

|  |      |    |             |   |  |   |  |
|--|------|----|-------------|---|--|---|--|
| <p>POTENTIOMETRIC SURFACE MAP —<br/>MANUFACTURING AREA, SITE M13 LANDFILL (FEBRUARY 2012)</p> <p>2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT<br/>JOLIET ARMY AMMUNITION PLANT<br/>WILL COUNTY, ILLINOIS</p> |      |    |             | <p>VERIFY SCALE</p> <p>BAR REPRESENTS<br/>ONE INCH ON ORIGINAL</p> <p>SCALE<br/>1" = 400'</p> |  | <p>R/R<br/>DEVELOPED BY</p> <p>12/18/12<br/>DATE</p> <p>CONTRACT NO. W91ZLK-05-D-0012<br/>DELIVERY ORDER NO. 0001</p> |  |
| REV  | DATE | BY | DESCRIPTION |   |  |   |  |
| PRINTED  |      |    |             | 12/19/2012  |  |   |  |
| <p><b>FIGURE 3-18</b></p> <p>DRAWING NUMBER</p> <p>2091115<br/>05010401</p>  |      |    |             |   |  |   |  |
|  |      |    |             |   |  |   |  |
| <p><b>TOUEST, INC.</b></p>   |      |    |             |   |  |   |  |





LEGEND

- MW126R OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- MW327R COMBINED MONITORING WELL LOCATION AND NUMBER
- MW362 SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- MW308 DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- DOWNGRADIENT MONITORING POINT
- UPGRADIENT MONITORING POINT
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF BEDROCK FLOW
- STUDY AREA BOUNDARIES
- APPROXIMATE LIMITS OF LANDFILL
- < RESULT SHOWS LAB LIMIT FOR NON-DETECTED RESULTS
- 2,4-DNT 2,4-DINITROTOLUENE
- 2,4,6-TNT 2,4,6-TRINITROTOLUENE
- 2-A-4,6-DNT 2-AMINO-4,6-DINITROTOLUENE
- 2-NT 2-NITROTOLUENE
- 3-NT 3-NITROTOLUENE
- 4-A-2,6-DNT 4-AMINO-2,6-DINITROTOLUENE
- 4-NT 4-NITROTOLUENE
- DUP DUPLICATE
- F/ CONCENTRATION BELOW THE REPORTED DETECTION LIMIT
- /J ESTIMATED CONCENTRATION
- U/ NOT DETECTED
- /UJ ESTIMATED DETECTION LIMIT
- LF/VF LAB FLAG/VALIDATION FLAG
- ND NOT DETECTED
- NS NO STANDARD
- RG REMEDIATION GOAL

| Compound    | Project Action Limit <sup>(1)</sup> | Surface Water RG |
|-------------|-------------------------------------|------------------|
| 2,4-DNT     | 0.42                                | 330              |
| 2,4,6-TNT   | 9.5                                 | 75               |
| 2-A-4,6-DNT | NS                                  | NS               |
| 2-NT        | 5100                                | 62               |
| 3-NT        | NS                                  | NS               |
| 4-A-2,6-DNT | NS                                  | NS               |
| 4-NT        | NS                                  | NS               |

NOTES

- REMEDATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (OAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
- BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE [HTTP://TERRASERVER-USA.COM](http://TERRASERVER-USA.COM), DATED APRIL 10, 2002.
- COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
- SAMPLES COLLECTED BY TOLTEST/MWH PERSONNEL IN FEBRUARY, MARCH, AND APRIL 2012.
- CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
- BOLDED VALUE INDICATES RG EXCEEDANCE.
- APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.




EXPLOSIVES DETECTIONS - MANUFACTURING AREA, SITE M13 LANDFILL (2012)


2012 SEMI-ANNUAL GROUNDWATER MONITORING REPORT JOLIET ARMY AMMUNITION PLANT WILL COUNTY, ILLINOIS

PRINTED 12/19/2012

FIGURE 3-20

DRAWING NUMBER 2091115 05010401





RJR DEVELOPED BY  
DWF DRAWN BY  
12/18/12 DATE  
APPROVED BY  
CONTRACT NO. W91ZLK-05-D-0012  
DELIVERY ORDER NO. 0001

VERIFY SCALE  
0 1 1/2  
BAR REPRESENTS ONE INCH ON ORIGINAL  
SCALE 1" = 400'

DESCRIPTION  
BY  
DATE  
REV

## **APPENDIX A**

### **LANDFILL INSPECTION REPORTS**

**A1 – LANDFILL INSPECTION REPORT – MARCH 2012**

**A2 – LANDFILL INSPECTION REPORT – APRIL 2012**

**A1 – LANDFILL INSPECTION REPORT – MARCH 2012**

# **POST-CLOSURE INSPECTION REPORT FOR LANDFILLS L3, M11, AND M13**

**for the Performance-Based Acquisition of  
Environmental Remediation Services at  
Joliet Army Ammunition Plant  
Joliet, Illinois**

**March 2012**

***Submitted to:***



**US Army Contracting Agency  
APG Directorate of Contracting - AEC Team  
E4460 Beal Road, APG-EA, MD 21010**

**Contract Number: W91ZLK-05-D-0012  
Delivery Order No. 0001**

**TolTest Project Number: 22271.01**

***Submitted by:***



**1480 Ford Street  
Maumee, OH 43537  
(419) 794-3500**

|   |                    |                                    |  |  |  |
|---|--------------------|------------------------------------|--|--|--|
| <b>REPORT DOCUMENTATION PAGE</b>  |                    |                                    | Form Approved<br>OMB No. 0704-0188                     |  |  |
| <p>The public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.</p> <p><b>PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.</b></p> |                    |                                    |  |  |  |
| <b>1. REPORT DATE (DD-MM-YYYY)</b><br>03-1-2012   |                    | <b>2. REPORT TYPE</b><br>Technical |  | <b>3. DATES COVERED (From – To)</b><br>January to March 2012 |  |
| <b>4. TITLE AND SUBTITLE</b><br>Post-Closure Inspection Report for Landfills L3, M11 and M13 for the 2008 Performance-Based Acquisition for Environmental Remediation, Joliet Army Ammunition Plant, Joliet, Illinois   |                    |                                    | <b>5a. CONTRACT NUMBER</b><br>W91ZLK-05-D-0012         |  |  |
|   |                    |                                    | <b>5b. GRANT NUMBER</b><br>NA                          |  |  |
|   |                    |                                    | <b>5c. PROGRAM ELEMENT NUMBER</b><br>NA                |  |  |
| <b>6. AUTHOR(S)</b><br>TolTest, Inc.  |                    |                                    | <b>5d. PROJECT NUMBER</b><br>Delivery Order 0001       |  |  |
|   |                    |                                    | <b>5e. TASK NUMBER</b><br>NA                           |  |  |
|   |                    |                                    | <b>5f. WORK UNIT NUMBER</b><br>NA                      |  |  |
| <b>PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b><br>TolTest, Inc.<br>1480 Ford Street<br>Maumee, OH 44087   |                    |                                    | <b>8. PERFORMING ORGANIZATION REPORT NUMBER</b>        |  |  |
| <b>9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b><br>USAEC - Louisville District<br>Aberdeen Proving Ground – W91ZLK<br>4118 Susquehanna Ave<br>Aberdeen Proving Ground, MD 21005-3013   |                    |                                    | <b>10. SPONSOR/MONITOR'S ACRONYM(S)</b><br>CELRL-ED-EE |  |  |
|   |                    |                                    | <b>11. SPONSOR/MONITOR'S REPORT NUMBER</b><br>NA       |  |  |
| <b>12. DISTRIBUTION/AVAILABILITY STATEMENT</b><br>Reference Distribution Page   |                    |                                    |  |  |  |
| <b>13. SUPPLEMENTARY NOTES</b><br>None.   |                    |                                    |  |  |  |
| <b>14. ABSTRACT</b><br>This Post-Closure Inspection report presents TolTest's findings for the conditions at landfills L3, M11 and M13 pursuant to the requirements of the Performance-Based Contract for Environmental Remediation at the Joliet Army Ammunition Plant.  |                    |                                    |  |  |  |
| <b>15. SUBJECT TERMS</b><br>Landfill, Inspection Report, L3, M11, M13   |                    |                                    |  |  |  |
| <b>16. SECURITY CLASSIFICATION OF:</b>  |                    |                                    | <b>17. LIMITATION OF ABSTRACT</b>                      | <b>18 NUMBER OF PAGES</b>                                    | <b>19a. NAME OF RESPONSIBLE PERSON</b>           |
| <b>a. REPORT</b>  | <b>b. ABSTRACT</b> | <b>c. THIS PAGE</b>                |  |  | <b>19b. TELEPHONE NUMBER (Include area code)</b> |

## **DISCLAIMER STATEMENT**

This report is a work prepared for the United States Government by TolTest. In no event shall either the United States Government or TolTest have any responsibility or liability for any consequences of any use, misuse, inability to use, or reliance on the information contained herein, nor does either warrant or otherwise represent in any way the accuracy, adequacy, efficacy, or applicability of the contents hereof.

# **POST-CLOSURE INSPECTION REPORT FOR LANDFILLS L3, M11, AND M13**

**for the Performance-Based Acquisition of  
Environmental Remediation Services at  
Joliet Army Ammunition Plant  
Joliet, Illinois**

***Submitted to:***



**US Army Contracting Agency  
APG Directorate of Contracting - AEC Team  
E4460 Beal Road, APG-EA, MD 21010**

**Contract Number: W91ZLK-05-D-0012  
Delivery Order No. 0001**

**TolTest Project Number: 22271.01**

***Submitted by:***



**1480 Ford Street  
Maumee, OH 43537  
(419) 794-3500**

**March 2012**

**DOCUMENT DISTRIBUTION**  
**for the**  
**Post-Closure Inspection Report for Landfills**  
**L3, M11, and M13**  
**for the Performance-Based Acquisition of**  
**Environmental Remediation**  
**Joliet Army Ammunition Plant**  
**Joliet, Illinois**

| <b>Organization</b>   | <b>Distribution</b> |                   |
|---|---------------------|-------------------|
|   | <b>Paper</b>        | <b>Electronic</b> |
| Joliet Army Ammunition Plant                                | 2                   | 2                 |
| Joliet Environmental Information Management System          | 0                   | 1                 |
| United States Army Environmental Command                    | 1                   | 2                 |
| United States Army Corps of Engineers - Louisville District | 0                   | 2                 |

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### List of Attachments

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| Attachment B ..... | Inspection Photographs             |

## LIST OF ACRONYMS

GMZ Ground Water Monitoring Zone

---

IAC Illinois Administrative Code

---

JOAAP Joliet Army Ammunition Plant

---

L3 JOAAP Landfill L3

---

M11 JOAAP Landfill M11

---

M13 JOAAP Landfill M13

---

RA Remedial Action

---

RG Remedial Goal

---

USAEC United States Army Environmental Command

---

## **POST-CLOSURE INSPECTION REPORT**

### **1.0 Introduction**

This document has been prepared for the United States Army Environmental Command to provide documentation of the conditions of three landfills (L3, M11, and M13) located at the former Joliet Army Ammunition Plant (JOAAP).

Post-closure monitoring requirements for Landfills L3, M11 and M13 are mandated by Illinois Administrative Code (IAC) Title 5, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for a period of 30 years. Objectives include:

- Confirm that the landfill cap has controlled leaching so that water quality will not be threatened in the future;
- Ensure that the cap is maintained in a manner that will not increase infiltration in the future or otherwise allow waste to be exposed; and
- Keep survey points protected and visible to facilitate identification in the future.

#### **1.1 Landfill Cover Maintenance**

According to IAC, the Landfills L3, M11 and M13 covers will be inspected on a quarterly basis for:

- Depressions indicating subsidence or other deformations that could breach the cover;
- Erosion features;
- Growth of deep rooted vegetation or invasive species that would adversely affect evapotranspiration and/or erosion armoring; and
- Debris or blockage of drainage structures.

Any damages or changes noted will be repaired to comply with the final design specifications for the cover.

Site inspections were conducted on 1 March 2012 for landfill M13, M11 and L3. This report includes copies of the inspection checklist, photographs, recommendations, and conclusions. The Post-Closure Inspection Checklists are found in Attachment A, and Inspection Photographs are found in Attachment B.

### **2.0 Landfill Descriptions**

#### **2.1 Landfill L3**

Landfill L3 is located on the western edge of the Site L3 GMZ on the east bank of Prairie Creek. The GMZ comprises approximately 50 acres used as a demolition area directly southwest of Site L2, of which the landfill occupies only 3.32 acres. The area of Landfill L3 was originally contaminated through import of contaminated fill. However, other waste and contaminated soil have been moved to the site as a part of the L3 RA in order to consolidate residual contamination into a smaller footprint. The remedy selected for the consolidated area along Prairie Creek was capping to form Landfill L3. Implementation of the remedy began in 2007 and was completed in 2008.

Landfill L3 is believed to contain metals and explosive residues that could continue to contaminate the underlying groundwater and migrate to Prairie Creek. Because the landfill is bordered by Prairie Creek, any contamination that infiltrates from the filled area would be expected to migrate to Prairie Creek and quickly be discharged as the groundwater flows upward into the surface water body.

### **2.1.1 Monitoring Locations**

Both groundwater and surface water sample points are monitored at Landfill L3 during spring and fall sampling rounds as follows:

- Upgradient Locations
  - SW004 (Surface location where Prairie Creek first enters the L3 GMZ boundary and upstream of the storm water outfall, spring only).
- Downgradient Locations
  - MW410
  - MW412
  - MW630
  - MW631
  - MW633
  - SW777 (Surface water location in Prairie Creek near the L3 GMZ boundary)
  - SW557 (Surface water location in Prairie Creek just upstream of the landfill drainage swale discharge)
  - SW558 (Surface water location at the constructed drainage swale along the southwest side of the newly constructed landfill)

## **2.2 Landfill M11**

Landfill M11 is located in the southwestern portion of the manufacturing side of JOAAP. The GMZ comprises approximately 133 acres. Site M11 was divided into two sections by School House Road and bordered on the west by West Patrol Road. M11 north encompassed approximately 10.5 acres of former gravel pits that were mined and filled with waste. M11 south, a former gravel pit, encompassed approximately 5.6 acres that was also mined and filled with waste. The remedy chosen for Landfill M11 was waste consolidation and capping. Implementation of the remedy began in 2006 and was completed in 2008.

The current conceptual site model is that Landfill M11 is believed to contain manganese and sulfate containing waste that could potentially contaminate underlying groundwater and migrate beyond the GMZ.

With the implementation of the RA at Site M11, it is anticipated that the landfill cap will prevent percolation of precipitation through waste consolidated in the landfill thus, preventing groundwater contamination.

### **2.2.1 Monitoring Locations**

Groundwater sample points are monitored at Landfill M11 in fall as follows:

- Upgradient Locations
  - MW802
  - MW803
- Downgradient Locations

- MW333
- MW334
- MW335
- MW336
- MW804
- MW805

In April 2012 samples will be collected from wells MW802, MW335, MW336, and MW805 only.

## **2.3 Landfill M13**

Landfill M13 comprises approximately 106 acres of the central portion of the MFG Area known as the gravel pits. It lies north of the Tetryl Production Area, east of the TNT Ditch Complex, and west of the Acid Area. Disposal activities were confined to four discrete areas on the site, none of which extended beyond 12 acres in size. Historical records indicate landfill disposal took place in the Northern Gravel Pit during the period 1966 to 1984 and involved scrap metals, creosote-treated railroad ties, telephone poles, and construction/demolition debris. The three other pits received waste materials that do not appear to pose a threat to human health and the environment.

Soil in the vicinity of the Northern Gravel Pit had been found to contain beryllium, lead, and benzo(a)pyrene as COCs. Explosive compounds that have been observed in groundwater at Site M13 include: TNT, TNB, 2,4-DNT, and 2,6-DNT. On a single occasion in 1991, antimony and cadmium were reported to be present at concentrations in excess of their respective RGs, but they have not exceeded the RGs since then. It is difficult to determine if the original findings could have resulted from turbid samples since low flow sampling and micro purging techniques are now employed to obtain more representative samples.

The current conceptual site model is that metal and benzo(a)pyrene in groundwater may be present as a result of leaching of waste materials in the Northern Gravel Pit. The explosives present in groundwater are far more likely to be present due to infiltration of wastewater in the TNT Ditch. There is no evidence to suggest explosive compounds were ever present in waste materials put into the pit.

With the implementation of the RA on the TNT Ditch and the capping of the Northern Gravel Pit, it is anticipated that contaminants in site groundwater will detach from the source areas and migrate as legacy plumes to the west. As such, concentrations are expected to decline with time.

### **2.3.1 Monitoring Locations**

Groundwater is monitored quarterly through sample collection and analysis at six monitoring wells:

- Upgradient or background wells
  - MW806
  - MW807
- Crossgradient
  - MW126R
  - MW362
- Downgradient or source control wells

- MW808
- MW809

### **3.0 Inspection Results**

The following are the observations from the landfill inspections conducted at L3, M11, and M13 on 1 March 2012.

#### **3.1 Landfill L3**

The perimeter fence and site postings were in good condition. The vegetative cover was well established and no erosion or woody plants were observed. No subsidence was observed nor was there any evidence of damage due to burrowing animals.

The rip rap along Prairie Creek at Site L3 has been washed away at several locations and is in need of repair. Although small areas of the synthetic cap is exposed at several locations as a result of the rip rap being washed away, the landfill appears to be stable and does not appear to be failing. The remaining rip rap also appears to be stable.

#### **3.2 Landfill M11**

The perimeter fence, gate and site postings were in good condition. The vegetative cover was well established and no erosion or woody plants were observed. The rip rap along the perimeter was evenly applied and no erosion channels were detected. There was no evidence of damage due to burrowing animals. The vents were undamaged and appeared to be in working order.

#### **3.3 Landfill M13**

The perimeter fence, gate and site postings were in good condition. The vegetative cover was well established and no erosion or woody plants were observed. The rip rap along the perimeter was evenly applied and no erosion channels were detected. The vents were undamaged and appeared to be in working order.

### **4.0 Conclusions and Recommendations**

The deficiencies noted within this report which need to be addressed include the following:

Landfill L3:

- Repair rip rap along Prairie creek.

Landfill M11:

- None detected

Landfill M13:

- None detected.

**Attachment A**  
**Post-Closure Inspection Checklists**

### JOAAP LANDFILL INSPECTION CHECKLIST

|  |     |                                   |                           |
|--|-----|-----------------------------------|---------------------------|
| Landfill Designation: M11                                    |     | Date of Inspection: March 1, 2012 |                           |
| Inspected By: Gary Reside, TolTest Environmental Manager     |     | Weather Conditions: Clear sky     |                           |
| Names of those present at inspection:                        |     |                                   |                           |
| Checklist  | Yes | No                                | Explanation               |
| <b>Site Security</b>   |     |                                   |                           |
| a) Was fencing, gates and signs in good condition?           | √   |                                   |                           |
| b) Were gates locked?  |     | √                                 | Chained shut with no lock |
| c) Evidence of trespassing                                   |     | √                                 |                           |
| <b>Landfill Cover</b>  |     |                                   |                           |
| d) Evidence of Settling and/or Ponding?                      |     | √                                 |                           |
| e) Any desiccation or cracking detected?                     |     | √                                 |                           |
| f) Erosion around cap?                                       |     | √                                 |                           |
| g) Animal burrowing detected?                                |     | √                                 |                           |
| <b>Vegetation Condition</b>                                  |     |                                   |                           |
| h) Is vegetation well established?                           | √   |                                   |                           |
| i) Evidence of vegetation detrimental to cap?                |     | √                                 |                           |
| <b>Landfill structures</b>                                   |     |                                   |                           |
| j) Evidence of damage to monitoring wells?                   |     | √                                 |                           |
| k) Evidence of damage to gas vents?                          |     | √                                 |                           |
| <b>Field Conclusions</b>                                     |     |                                   |                           |
| l) Is there an imminent hazard to the integrity of the unit? |     | √                                 |                           |
| m) Are repairs necessary?                                    |     | √                                 |                           |
| <b>Certification</b>   |     |                                   |                           |
| Inspector Signature:<br>Gary Reside                          |     | Printed Name: Gary Reside         |                           |
| Title: Environmental Manager                                 |     | Date: March 1, 2012               |                           |

| JOAAP LANDFILL INSPECTION CHECKLIST                          |     |                                   |                                    |
|--|-----|-----------------------------------|------------------------------------|
| Landfill Designation: L3                                     |     | Date of Inspection: March 1, 2012 |                                    |
| Inspected By: Gary Reside, TolTest Environmental Manager     |     | Weather Conditions: Clear sky     |                                    |
| Names of those present at inspection:                        |     |                                   |                                    |
| Checklist  | Yes | No                                | Explanation                        |
| Site Security  |     |                                   |                                    |
| a) Was fencing, gates and signs in good condition?           | √   |                                   |                                    |
| b) Were gates locked?  | √   |                                   |                                    |
| c) Evidence of trespassing                                   |     | √                                 |                                    |
| Landfill Cover   |     |                                   |                                    |
| d) Evidence of Settling and/or Ponding?                      |     | √                                 |                                    |
| e) Any desiccation or cracking detected?                     |     | √                                 |                                    |
| f) Erosion around cap?                                       |     | √                                 |                                    |
| g) Animal Burrowing detected?                                |     | √                                 |                                    |
| Vegetation Condition   |     |                                   |                                    |
| h) Is vegetation well established?                           | √   |                                   |                                    |
| i) Evidence of vegetation detrimental to cap?                |     | √                                 |                                    |
| Landfill structures  |     |                                   |                                    |
| j) Evidence of damage to monitoring wells?                   |     | √                                 |                                    |
| k) Evidence of damage to gas vents?                          |     | √                                 |                                    |
| Field Conclusions  |     |                                   |                                    |
| l) Is there an imminent hazard to the integrity of the unit? |     | √                                 |                                    |
| m) Are repairs necessary?                                    | √   |                                   | Rip Rap on West side needs repairs |
| Certification  |     |                                   |                                    |
| Inspector Signature: Gary Reside                             |     | Printed Name: Gary Reside         |                                    |
| Title: Environmental Manager                                 |     | Date: March 1, 2012               |                                    |

| JOAAP LANDFILL INSPECTION CHECKLIST                          |     |                                   |                          |
|--|-----|-----------------------------------|--------------------------|
| Landfill Designation: M13                                    |     | Date of Inspection: March 1, 2012 |                          |
| Inspected By: Gary Reside, TolTest Environmental Manager     |     | Weather Conditions: Clear sky     |                          |
| Names of those present at inspection:                        |     |                                   |                          |
| Checklist  | Yes | No                                | Explanation              |
| Site Security  |     |                                   |                          |
| a. Was fencing, gates and signs in good condition?           | √   |                                   |                          |
| b. Were gates locked?  | √   |                                   | New lock placed on gate. |
| c. Evidence of trespassing                                   |     | √                                 |                          |
| Landfill Cover   |     |                                   |                          |
| d. Evidence of Settling and/or Ponding?                      |     | √                                 |                          |
| e. Any desiccation or cracking detected?                     |     | √                                 |                          |
| f. Erosion around cap?                                       |     | √                                 |                          |
| g. Animal burrowing detected?                                |     | √                                 |                          |
| Vegetation Condition   |     |                                   |                          |
| h. Is vegetation well established?                           | √   |                                   |                          |
| i. Evidence of vegetation detrimental to cap?                |     | √                                 |                          |
| Landfill structures  |     |                                   |                          |
| j. Evidence of damage to monitoring wells?                   |     | √                                 |                          |
| k. Evidence of damage to gas vents?                          |     | √                                 |                          |
| Field Conclusions  |     |                                   |                          |
| l. Is there an imminent hazard to the integrity of the unit? |     | √                                 |                          |
| m. Are repairs necessary?                                    |     | √                                 |                          |
| Certification  |     |                                   |                          |
| Inspector Signature:   |     | Printed Name: Gary Reside         |                          |
| Title: Environmental Manager                                 |     | Date: March 1, 2012               |                          |

**Attachment B**  
**Inspection Photographs**



L3 West side looking South along Prairie Creek



L3 North side looking East



L3 East side looking South



L3 East side looking North



L3 South side looking West



M13 SW corner looking East



M13 locked gate



M13 NW corner looking SE



M13 top of cap looking SE



M13 top of cap looking East



M13 East side looking North



M11 South side looking NW



M11 SE corner looking North



M11 top of cap looking North.



M11 top of cap looking West.



M11 North side looking West.



M11 East side looking South

**A2 - LANDFILL INSPECTION REPORT – APRIL 2012**

# **POST-CLOSURE INSPECTION REPORT FOR LANDFILLS L3, M11, AND M13**

**for the Performance-Based Acquisition of  
Environmental Remediation Services at  
Joliet Army Ammunition Plant  
Joliet, Illinois**

**April 2012**

***Submitted to:***



**US Army Contracting Agency  
APG Directorate of Contracting - AEC Team  
E4460 Beal Road, APG-EA, MD 21010**

**Contract Number: W91ZLK-05-D-0012  
Delivery Order No. 0001**

**TolTest Project Number: 22271.01**

***Submitted by:***



**1480 Ford Street  
Maumee, OH 43537  
(419) 794-3500**

|   |                    |                                    |  |   |  |
|---|--------------------|------------------------------------|--|---|--|
| <b>REPORT DOCUMENTATION PAGE</b>  |                    |                                    | Form Approved<br>OMB No. 0704-0188                     |   |  |
| <p>The public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.</p> <p><b>PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.</b></p> |                    |                                    |  |   |  |
| <b>1. REPORT DATE (DD-MM-YYYY)</b><br>06-20-2012  |                    | <b>2. REPORT TYPE</b><br>Technical |  | <b>3. DATES COVERED (From – To)</b><br>April to June 2012 |  |
| <b>4. TITLE AND SUBTITLE</b><br>Post-Closure Inspection Report for Landfills L3, M11 and M13 for the 2008 Performance-Based Acquisition for Environmental Remediation, Joliet Army Ammunition Plant, Joliet, Illinois   |                    |                                    | <b>5a. CONTRACT NUMBER</b><br>W91ZLK-05-D-0012         |   |  |
|   |                    |                                    | <b>5b. GRANT NUMBER</b><br>NA                          |   |  |
|   |                    |                                    | <b>5c. PROGRAM ELEMENT NUMBER</b><br>NA                |   |  |
| <b>6. AUTHOR(S)</b><br>TolTest, Inc.  |                    |                                    | <b>5d. PROJECT NUMBER</b><br>Delivery Order 0001       |   |  |
|   |                    |                                    | <b>5e. TASK NUMBER</b><br>NA                           |   |  |
|   |                    |                                    | <b>5f. WORK UNIT NUMBER</b><br>NA                      |   |  |
| <b>PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b><br>TolTest, Inc.<br>1480 Ford Street<br>Maumee, OH 44087   |                    |                                    | <b>8. PERFORMING ORGANIZATION REPORT NUMBER</b>        |   |  |
| <b>9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b><br>USAEC - Louisville District<br>Aberdeen Proving Ground – W91ZLK<br>4118 Susquehanna Ave<br>Aberdeen Proving Ground, MD 21005-3013   |                    |                                    | <b>10. SPONSOR/MONITOR'S ACRONYM(S)</b><br>CELRL-ED-EE |   |  |
|   |                    |                                    | <b>11. SPONSOR/MONITOR'S REPORT NUMBER</b><br>NA       |   |  |
| <b>12. DISTRIBUTION/AVAILABILITY STATEMENT</b><br>Reference Distribution Page   |                    |                                    |  |   |  |
| <b>13. SUPPLEMENTARY NOTES</b><br>None.   |                    |                                    |  |   |  |
| <b>14. ABSTRACT</b><br>This Post-Closure Inspection report presents TolTest's findings for the conditions at landfills L3, M11 and M13 pursuant to the requirements of the Performance-Based Contract for Environmental Remediation at the Joliet Army Ammunition Plant.  |                    |                                    |  |   |  |
| <b>15. SUBJECT TERMS</b><br>Landfill, Inspection Report, L3, M11, M13   |                    |                                    |  |   |  |
| <b>16. SECURITY CLASSIFICATION OF:</b>  |                    |                                    | <b>17. LIMITATION OF ABSTRACT</b>                      | <b>18 NUMBER OF PAGES</b>                                 | <b>19a. NAME OF RESPONSIBLE PERSON</b>           |
| <b>a. REPORT</b>  | <b>b. ABSTRACT</b> | <b>c. THIS PAGE</b>                |  |   | <b>19b. TELEPHONE NUMBER (Include area code)</b> |

## **DISCLAIMER STATEMENT**

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# **POST-CLOSURE INSPECTION REPORT FOR LANDFILLS L3, M11, AND M13**

**for the Performance-Based Acquisition of  
Environmental Remediation Services at  
Joliet Army Ammunition Plant  
Joliet, Illinois**

***Submitted to:***



**US Army Contracting Agency  
APG Directorate of Contracting - AEC Team  
E4460 Beal Road, APG-EA, MD 21010**

**Contract Number: W91ZLK-05-D-0012  
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**TolTest Project Number: 22271.01**

***Submitted by:***



**1480 Ford Street  
Maumee, OH 43537  
(419) 794-3500**

**April 2012**

**DOCUMENT DISTRIBUTION**  
**for the**  
**Post-Closure Inspection Report for Landfills**  
**L3, M11, and M13**  
**for the Performance-Based Acquisition of**  
**Environmental Remediation**  
**Joliet Army Ammunition Plant**  
**Joliet, Illinois**

| <b>Organization</b>   | <b>Distribution</b> |                   |
|---|---------------------|-------------------|
|   | <b>Paper</b>        | <b>Electronic</b> |
| Joliet Army Ammunition Plant                                | 2                   | 2                 |
| Joliet Environmental Information Management System          | 0                   | 1                 |
| United States Army Environmental Command                    | 1                   | 2                 |
| United States Army Corps of Engineers - Louisville District | 0                   | 2                 |

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## LIST OF ACRONYMS

GMZ Ground Water Monitoring Zone

---

IAC Illinois Administrative Code

---

JOAAP Joliet Army Ammunition Plant

---

L3 JOAAP Landfill L3

---

M11 JOAAP Landfill M11

---

M13 JOAAP Landfill M13

---

RA Remedial Action

---

RG Remedial Goal

---

USAEC United States Army Environmental Command

---

## **POST-CLOSURE INSPECTION REPORT**

### **1.0 Introduction**

This document has been prepared for the United States Army Environmental Command to provide documentation of the conditions of three landfills (L3, M11, and M13) located at the former Joliet Army Ammunition Plant (JOAAP).

Post-closure monitoring requirements for Landfills L3, M11 and M13 are mandated by Illinois Administrative Code (IAC) Title 5, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for a period of 30 years. Objectives include:

- Confirm that the landfill cap has controlled leaching so that water quality will not be threatened in the future;
- Ensure that the cap is maintained in a manner that will not increase infiltration in the future or otherwise allow waste to be exposed; and
- Keep survey points protected and visible to facilitate identification in the future.

#### **1.1 Landfill Cover Maintenance**

According to IAC, the Landfills L3, M11 and M13 covers will be inspected on a quarterly basis for:

- Depressions indicating subsidence or other deformations that could breach the cover;
- Erosion features;
- Growth of deep rooted vegetation or invasive species that would adversely affect evapotranspiration and/or erosion armoring; and
- Debris or blockage of drainage structures.

Any damages or changes noted will be repaired to comply with the final design specifications for the cover.

Site inspections were conducted on 18 April 2012 for landfill M13, M11 and L3. This report includes copies of the inspection checklist, photographs, recommendations, and conclusions. The Post-Closure Inspection Checklists are found in Attachment A, and Inspection Photographs are found in Attachment B.

### **2.0 Landfill Descriptions**

#### **2.1 Landfill L3**

Landfill L3 is located on the western edge of the Site L3 GMZ on the east bank of Prairie Creek. The GMZ comprises approximately 50 acres used as a demolition area directly southwest of Site L2, of which the landfill occupies only 3.32 acres. The area of Landfill L3 was originally contaminated through import of contaminated fill. However, other waste and contaminated soil have been moved to the site as a part of the L3 RA in order to consolidate residual contamination into a smaller footprint. The remedy selected for the consolidated area along Prairie Creek was capping to form Landfill L3. Implementation of the remedy began in 2007 and was completed in 2008.

Landfill L3 is believed to contain metals and explosive residues that could continue to contaminate the underlying groundwater and migrate to Prairie Creek. Because the landfill is bordered by Prairie Creek, any contamination that infiltrates from the filled area would be expected to migrate to Prairie Creek and quickly be discharged as the groundwater flows upward into the surface water body.

### **2.1.1 Monitoring Locations**

Both groundwater and surface water sample points are monitored at Landfill L3 during spring and fall sampling rounds as follows:

- Upgradient Locations
  - SW004 (Surface location where Prairie Creek first touches the L3 GMZ boundary and upstream of the storm water outfall, spring only).
- Downgradient Locations
  - MW410
  - MW412
  - MW630
  - MW631
  - MW633
  - SW777 (Surface water location in Prairie Creek near the L3 GMZ boundary)
  - SW557 (Surface water location in Prairie Creek just upstream of the landfill drainage swale discharge)
  - SW558 (Surface water location at the constructed drainage swale along the southwest side of the newly constructed landfill)

## **2.2 Landfill M11**

Landfill M11 is located in the southwestern portion of the manufacturing side of JOAAP. The GMZ comprises approximately 133 acres. Site M11 was divided into two sections by School House Road and bordered on the west by West Patrol Road. M11 north encompassed approximately 10.5 acres of former gravel pits that were mined and filled with waste. M11 south, a former gravel pit, encompassed approximately 5.6 acres that was also mined and filled with waste. The remedy chosen for Landfill M11 was waste consolidation and capping. Implementation of the remedy began in 2006 and was completed in 2008.

The current conceptual site model is that Landfill M11 is believed to contain manganese and sulfate containing waste that could potentially contaminate underlying groundwater and migrate beyond the GMZ.

With the implementation of the RA at Site M11, it is anticipated that the landfill cap will prevent percolation of precipitation through waste consolidated in the landfill thus, preventing groundwater contamination.

### **2.2.1 Monitoring Locations**

Groundwater sample points are monitored at Landfill M11 in fall as follows:

- Upgradient Locations
  - MW802
  - MW803
- Downgradient Locations

- MW333
- MW334
- MW335
- MW336
- MW804
- MW805

In April 2012 samples were collected from wells MW802, MW335, MW336, and MW805 only.

## **2.3 Landfill M13**

Landfill M13 comprises approximately 106 acres of the central portion of the MFG Area known as the gravel pits. It lies north of the Tetryl Production Area, east of the TNT Ditch Complex, and west of the Acid Area. Disposal activities were confined to four discrete areas on the site, none of which extended beyond 12 acres in size. Historical records indicate landfill disposal took place in the Northern Gravel Pit during the period 1966 to 1984 and involved scrap metals, creosote-treated railroad ties, telephone poles, and construction/demolition debris. The three other pits received waste materials that do not appear to pose a threat to human health and the environment.

Soil in the vicinity of the Northern Gravel Pit had been found to contain beryllium, lead, and benzo(a)pyrene as COCs. Explosive compounds that have been observed in groundwater at Site M13 include: TNT, TNB, 2,4-DNT, and 2,6-DNT. On a single occasion in 1991, antimony and cadmium were reported to be present at concentrations in excess of their respective RGs, but they have not exceeded the RGs since then. It is difficult to determine if the original findings could have resulted from turbid samples since low flow sampling and micro purging techniques are now employed to obtain more representative samples.

The current conceptual site model is that metal and benzo(a)pyrene in groundwater may be present as a result of leaching of waste materials in the Northern Gravel Pit. The explosives present in groundwater are far more likely to be present due to infiltration of wastewater in the TNT Ditch. There is no evidence to suggest explosive compounds were ever present in waste materials put into the pit.

With the implementation of the RA on the TNT Ditch and the capping of the Northern Gravel Pit, it is anticipated that contaminants in site groundwater will detach from the source areas and migrate as legacy plumes to the west. As such, concentrations are expected to decline with time.

### **2.3.1 Monitoring Locations**

Groundwater is monitored quarterly through sample collection and analysis at six monitoring wells:

- Upgradient or background wells
  - MW806
  - MW807
- Cross Gradient
  - MW126R
  - MW362

- Downgradient or source control wells
  - MW808
  - MW809

### **3.0 Inspection Results**

The following are the observations from the landfill inspections conducted at L3, M11, and M13 on 18 April 2012.

#### **3.1 Landfill L3**

The perimeter fence and site postings were in good condition. The vegetative cover was well established and no erosion was observed. All woody plants observed on the landfill cap during the inspection were cut and removed. No subsidence was observed nor was there any evidence of damage due to burrowing animals.

The rip rap along Prairie Creek at Site L3 has been washed away at several locations and is in need of repair. Although small areas of the synthetic cap is exposed at several locations as a result of the rip rap being washed away, the landfill appears to be stable and does not appear to be failing. The remaining rip rap also appears to be stable.

#### **3.2 Landfill M11**

The perimeter fence, gate and site postings were in good condition. The vegetative cover was well established and no erosion was observed. All woody plants observed on the landfill cap during the inspection were cut and removed. The rip rap along the perimeter was evenly applied and no erosion channels were detected. There was no evidence of damage due to burrowing animals. The vents were undamaged and appeared to be in working order.

#### **3.3 Landfill M13**

The perimeter fence, gate and site postings were in good condition. The vegetative cover was well established and no erosion was observed. All woody plants observed on the landfill cap during the inspection were cut and removed. The rip rap along the perimeter was evenly applied and no erosion channels were detected. The vents were undamaged and appeared to be in working order.

### **4.0 Conclusions and Recommendations**

The deficiencies noted within this report which need to be addressed include the following:

Landfill L3:

- Repair rip rap along Prairie creek. The Army is currently preparing the contract documentation necessary for implementation of the repairs.
- Some woody plants were observed on the landfill cap during the inspection and were cut and removed.

Landfill M11:

- Some woody plants were observed on the landfill cap during the inspection and were cut and removed.

Landfill M13:

- Some woody plants were observed on the landfill cap during the inspection and were cut and removed.

**Attachment A**  
**Post-Closure Inspection Checklists**

### JOAAP LANDFILL INSPECTION CHECKLIST

|  |     |                                    |   |
|--|-----|------------------------------------|---|
| Landfill Designation: M11                                    |     | Date of Inspection: April 18, 2012 |   |
| Inspected By: Gary Reside, TolTest Environmental Manager     |     | Weather Conditions: Clear sky      |   |
| Names of those present at inspection:                        |     |                                    |   |
| Checklist  | Yes | No                                 | Explanation   |
| <b>Site Security</b>   |     |                                    |   |
| a) Was fencing, gates and signs in good condition?           | √   |                                    |   |
| b) Were gates locked?  |     | √                                  | Chained shut with no lock   |
| c) Evidence of trespassing                                   |     | √                                  |   |
| <b>Landfill Cover</b>  |     |                                    |   |
| d) Evidence of Settling and/or Ponding?                      |     | √                                  |   |
| e) Any desiccation or cracking detected?                     |     | √                                  |   |
| f) Erosion around cap?                                       |     | √                                  |   |
| g) Animal burrowing detected?                                |     | √                                  |   |
| <b>Vegetation Condition</b>                                  |     |                                    |   |
| h) Is vegetation well established?                           | √   |                                    |   |
| i) Evidence of vegetation detrimental to cap?                | √   |                                    | All woody plants observed on the landfill cap during the inspection were cut and removed. |
| <b>Landfill structures</b>                                   |     |                                    |   |
| j) Evidence of damage to monitoring wells?                   |     | √                                  |   |
| k) Evidence of damage to gas vents?                          |     | √                                  |   |
| <b>Field Conclusions</b>                                     |     |                                    |   |
| l) Is there an imminent hazard to the integrity of the unit? |     | √                                  |   |
| m) Are repairs necessary?                                    |     | √                                  |   |
| <b>Certification</b>   |     |                                    |   |
| Inspector Signature:<br>Gary Reside                          |     | Printed Name: Gary Reside          |   |
| Title: Environmental Manager                                 |     | Date: April 18, 2012               |   |

| JOAAP LANDFILL INSPECTION CHECKLIST                          |     |                                    |   |
|--|-----|------------------------------------|---|
| Landfill Designation: L3                                     |     | Date of Inspection: April 18, 2012 |   |
| Inspected By: Gary Reside, TolTest Environmental Manager     |     | Weather Conditions: Clear sky      |   |
| Names of those present at inspection:                        |     |                                    |   |
| Checklist  | Yes | No                                 | Explanation   |
| Site Security  |     |                                    |   |
| a) Was fencing, gates and signs in good condition?           | √   |                                    |   |
| b) Were gates locked?  | √   |                                    |   |
| c) Evidence of trespassing                                   |     | √                                  |   |
| Landfill Cover   |     |                                    |   |
| d) Evidence of Settling and/or Ponding?                      |     | √                                  |   |
| e) Any desiccation or cracking detected?                     |     | √                                  |   |
| f) Erosion around cap?                                       |     | √                                  |   |
| g) Animal Burrowing detected?                                |     | √                                  |   |
| Vegetation Condition   |     |                                    |   |
| h) Is vegetation well established?                           | √   |                                    |   |
| i) Evidence of vegetation detrimental to cap?                | √   |                                    | All woody plants observed on the landfill cap during the inspection were cut and removed. |
| Landfill structures  |     |                                    |   |
| j) Evidence of damage to monitoring wells?                   |     | √                                  |   |
| k) Evidence of damage to gas vents?                          |     | √                                  |   |
| Field Conclusions  |     |                                    |   |
| l) Is there an imminent hazard to the integrity of the unit? |     | √                                  |   |
| m) Are repairs necessary?                                    | √   |                                    | Rip Rap on West side needs repairs  |
| Certification  |     |                                    |   |
| Inspector Signature: Gary Reside                             |     | Printed Name: Gary Reside          |   |
| Title: Environmental Manager                                 |     | Date: April 18, 2012               |   |

### JOAAP LANDFILL INSPECTION CHECKLIST

|  |     |                                    |   |
|--|-----|------------------------------------|---|
| Landfill Designation: M13                                    |     | Date of Inspection: April 18, 2012 |   |
| Inspected By: Gary Reside, TolTest Environmental Manager     |     | Weather Conditions: Clear sky      |   |
| Names of those present at inspection:                        |     |                                    |   |
| Checklist  | Yes | No                                 | Explanation   |
| <b>Site Security</b>   |     |                                    |   |
| a. Was fencing, gates and signs in good condition?           | √   |                                    |   |
| b. Were gates locked?  | √   |                                    | New lock placed on gate.  |
| c. Evidence of trespassing                                   |     | √                                  |   |
| <b>Landfill Cover</b>  |     |                                    |   |
| d. Evidence of Settling and/or Ponding?                      |     | √                                  |   |
| e. Any desiccation or cracking detected?                     |     | √                                  |   |
| f. Erosion around cap?                                       |     | √                                  |   |
| g. Animal burrowing detected?                                |     | √                                  |   |
| <b>Vegetation Condition</b>                                  |     |                                    |   |
| h. Is vegetation well established?                           | √   |                                    |   |
| i. Evidence of vegetation detrimental to cap?                | √   |                                    | All woody plants observed on the landfill cap during the inspection were cut and removed. |
| <b>Landfill structures</b>                                   |     |                                    |   |
| j. Evidence of damage to monitoring wells?                   |     | √                                  |   |
| k. Evidence of damage to gas vents?                          |     | √                                  |   |
| <b>Field Conclusions</b>                                     |     |                                    |   |
| l. Is there an imminent hazard to the integrity of the unit? |     | √                                  |   |
| m. Are repairs necessary?                                    |     | √                                  |   |
| <b>Certification</b>   |     |                                    |   |
| Inspector Signature:   |     | Printed Name: Gary Reside          |   |
| Title: Environmental Manager                                 |     | Date: April 18, 2012               |   |

**Attachment B**  
**Inspection Photographs**



L3 West side looking South.



L3 North side looking East



L3 East side of landfill



L3 East side of landfill



M11 South side looking North.



M11 West side looking Northeast.



M11 West side looking North.



M11 Top of cap looking North.



M11 East side looking North.



M13 Top of cap looking East.



M13 East side looking South.



M13 East side looking North.



M13 South side looking East.



M13 South side looking West.

## **APPENDIX B**

### **DATA REPORTS**

**B1 – DATA USABILITY REPORT**

**B2 – DATA VALIDATION REPORTS – LABORATORY DATA CONSULTANTS  
(LDC)**

**B1 - DATA USABILITY REPORT**

## **APPENDIX B1**

### **DATA USABILITY REPORT GROUNDWATER AND SURFACE WATER SAMPLING FEBRUARY AND APRIL 2012**

#### **JOLIET ARMY AMMUNITION PLANT WILL COUNTY, ILLINOIS**

**Submitted to:**



**US Army Contracting Agency  
APG Directorate of Contracting – AEC Team  
E4460 Beal Road, APG-EA, MD 21010**

**Contract Number: W91ZLK-05-D-0012**

**TolTest Project Number: 22271.01**

**Submitted by:**



**1480 Ford Street  
Maumee, OH 43537  
(419) 794-3500**

**April 2013**

# DATA USABILITY REPORT

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CRS\BTZ\RJR

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## ACRONYMS AND ABBREVIATIONS

|              |   |
|--------------|---|
| %D           | percent difference  |
| %R           | percent recovery  |
| CCB          | continuing calibration blank                                  |
| CCV          | continuing calibration verification                           |
| GC/MS        | gas chromatography/mass spectroscopy                          |
| ICAL         | initial calibration   |
| ICB          | initial calibration blank                                     |
| ICS          | interference check sample                                     |
| ICV          | initial calibration verification                              |
| J            | estimated value   |
| JOAAP        | Joliet Army Ammunition Plant                                  |
| LCS/LCSD     | laboratory control sample/laboratory control sample duplicate |
| LDC          | Laboratory Data Consultants                                   |
| MD           | matrix duplicate (metals)                                     |
| mg/L         | milligrams per liter  |
| MRL          | method reporting limit  |
| MS/MSD       | matrix spike/matrix spike duplicate                           |
| MWH          | MWH Americas, Inc.  |
| ORP          | oxidation/reduction potential                                 |
| QA           | quality assurance   |
| QC           | quality control   |
| R            | analytical result is unusable                                 |
| RPD          | relative percent difference                                   |
| SDG          | sample delivery group   |
| SVOCs        | semivolatile organic compounds                                |
| TAL          | target analyte list   |
| Test America | Test America Laboratories, Inc.                               |
| ug/L         | micrograms per liter  |
| U            | analyte analyzed for but not detected                         |
| UJ           | analyte is not detected estimated quantitation limit          |
| USEPA        | United States Environmental Protection Agency                 |
| VOCs         | volatile organic compounds                                    |

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## **APPENDIX B1**

### **DATA USABILITY SUMMARY**

#### **1.0 INTRODUCTION**

The following data usability summary discusses quality assurance/quality control (QA/QC) outliers for each analyte group per sampling round. Data qualifiers were added to results and imported into the Joliet Army Ammunition Plant (JOAAP) database. Data qualifiers used in the validation process may include the following:

- U – Not detected. This validation qualifier was added if there was blank contamination and the sample concentration was less than five times the blank concentration (ten times for common organic contaminants methylene chloride, acetone, phthalates)
- J – Estimated value. This validation qualifier was added if the reported concentration is estimated.
- UJ – Not detected, estimated quantitation limit. This validation qualifier was added if the analyte was not detected but QA/QC parameters were not met.
- R – Unusable data. This validation qualifier was added if the analyte was not detected but QA/QC parameters were not met and were extremely low (i.e. less than 10% recovery for laboratory control samples (LCS) or surrogate recoveries)

Test America Laboratories, Inc. (Test America) located at 2417 Bond Street, University Park, Illinois performed the analyses of groundwater and surface water samples collected in February and April 2012 at the JOAAP located in Wilmington, Illinois. Groundwater was collected from site M13 Landfill and analyzed for the following parameters in February 2012:

- Volatile organic compounds (VOCs) were analyzed by SW846 Method 8260B.
- Semivolatile organic compounds (SVOCs) were analyzed by SW846 Method 8270C.
- Explosives were analyzed by SW846 Method 8330.
- Target analyte list (TAL) metals were analyzed by SW846 Methods 6010B and 7470A (mercury).
- Sulfate was analyzed by United States Environmental Protection Agency (USEPA) Method 300.0.
- Nitrate was analyzed by USEPA Method 300.0.

Groundwater was collected from nine sites and analyzed for the following parameters in April 2012:

- VOCs were analyzed by SW846 Method 8260B at Sites M3, M11 Landfill and M13 Landfill.

- SVOCs were analyzed by SW846 Method 8270C at Sites M11 Landfill and M13 Landfill.
- Explosives were analyzed by SW846 Method 8330 at Sites M5, M6, M7, L1, L2, L3, L14, OA, L3 Landfill, M11 Landfill, and M13 Landfill.
- TAL metals were analyzed by SW846 Methods 6010B and 7470A at Sites L2, L3, L3 Landfill, M11 Landfill, and M13 Landfill.
- Sulfate was analyzed by USEPA Method 300.0 at Sites M1, M8, M9, M11 Landfill and M13 Landfill.
- Nitrate was analyzed by USEPA Method 300.0 at Sites M11 Landfill and M13 Landfill.

Surface water was collected from three sites at JOAAP and analyzed for the following parameters:

- Explosives were analyzed by SW846 Method 8330 at Sites L1, L2, L3, and L3 Landfill.
- TAL metals were analyzed by SW846 Methods 6010B and 7470A at Sites L1 and L3 Landfill.
- Sulfate was analyzed by USEPA Method 300.0 at Site M1.

Field parameters are not discussed in this data usability report, but were recorded by field personnel with a water quality meter at the time of sample collection and included:

- pH, temperature, specific conductivity, dissolved oxygen, turbidity, and oxidation/reduction potential (ORP)

The following summarizes the sample delivery group (SDG) and corresponding data validation report:

| <b>Sample Delivery Group</b> | <b>Data Validation Report Number</b> | <b>Associated Samples</b>   |
|------------------------------|--------------------------------------|---|
| 500-44539-1                  | 27391                                | JP-M13-GWMW126R<br>JP-M13-GWMW362<br>JP-M13-GWMW806<br>JP-M13-GWMW807<br>JP-M13-GWMW808<br>JP-M13-GWMW809<br>JP-M13-GWMW999       |
| 500-44555-1                  | 27391                                | JP-M13-GWAEHA14R<br>JP-M13-GWAEHA15   |
| 500-45420-1                  | 27595                                | JP-L1-GWMW173-0412<br>JP-L1-GWMW174-0412<br>JP-L1-GWMWWES3-0412<br>JP-L3-GWMW410-0412<br>JP-L3-GWMW412-0412<br>JP-L3-GWMW630-0412 |

| Sample Delivery Group | Data Validation Report Number | Associated Samples   |
|-----------------------|-------------------------------|--|
|                       |                               | JP-L3-GWMW631-0412<br>JP-L3-GWMW633-0412<br>JP-L3-GWMW999-0412<br>JP-L3-SW557-0412<br>JP-L3-SW558-0412<br>JP-L3-SW777-0412   |
| 500-45457-1           | 27605                         | JP-L3-SW004-0412<br>JP-M1-GWMW648-0412<br>JP-M1-GWMW998-0412<br>JP-M1-GWMW641-0412<br>JP-M1-GWMW997-0412<br>JP-M1-GWMW642-0412<br>JP-M1-GWMW640-0412<br>JP-M1-GWMW107-0412<br>JP-M1-GWMW231-0412<br>JP-M1-GWMW645-0412<br>JP-M1-GWMW646<br>JP-M1-GWMW649<br>JP-M1-GWMW644<br>JP-M1-GWMW643<br>JP-M1-SW709<br>JP-L1-GWMW131<br>JP-L1-GWWES1<br>JP-L1-SW550<br>JP-OA-GWMW118<br>JP-OA-GWMW119<br>JP-OA-GWMW117 |
| 500-45518-1           | 27469                         | JP-M13-GWMW126R<br>JP-M13-GWMW362<br>JP-M13-GWMW806<br>JP-M13-GWMW807<br>JP-M13-GWMW808<br>JP-M13-GWMW809<br>JP-M13-GWMW999  |
| 500-45519-1           | 27649                         | JP-M06-GWMW654<br>JP-M11-GWMW335<br>JP-M11-GWMW336<br>JP-M11-GWMW802<br>JP-M11-GWMW805<br>JP-M9-GWMW330  |
| 500-45521-1           | 27649                         | JP-M06-GWMW123R<br>JP-M06-GWMW162R<br>JP-M06-GWMW212R  |

| Sample Delivery Group | Data Validation Report Number | Associated Samples  |
|-----------------------|-------------------------------|---|
|                       |                               | JP-M06-GWMW313<br>JP-M06-GWMW318<br>JP-M06-GWMW319<br>JP-M06-GWMW652<br>JP-M06-GWMW994<br>JP-M06-GWMW995<br>JP-M07-GWMW124R |

## 2.0 LABORATORY QA/QC ELEMENTS

Laboratory Data Consultants, Inc. (LDC) located at 7750 El Camino Real, Suite 2L, Carlsbad, California performed the equivalent of USEPA Level III validation on 100% of the data using the JOAAP Quality Assurance Project Plan (QAPP) for Long Term Monitoring, a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, and the Department of Defense Quality Systems Manual for Environmental Laboratories validation guidelines, as appropriate. QAPP Worksheets # 34, #35, and #36 describe the verification process and QAPP Worksheet #37 describes the data usability assessment.

Data were evaluated for precision, accuracy, representativeness, comparability, and completeness based on results of the following QA/QC samples and parameters, where applicable:

- Sample preservation
- Sample holding times
- Surrogate spikes (organics)
- Laboratory control sample (LCS/LCSD)
- Matrix spike/matrix spike duplicate (MS/MSD)
- Matrix duplicate (MD) for metals
- Laboratory duplicate samples
- Gas chromatography/mass spectroscopy (GC/MS) tunes (organics)
- Internal standards (organics)
- Initial calibration (ICAL) standards
- Initial calibration verification (ICV) standards
- Continuing calibration verification (CCV) standards
- Interference check samples (ICSs) (metals)
- Trip blanks (VOCs)
- Serial dilution (metals)
- Method blanks
- Initial calibration blanks (ICBs)
- Continuing calibration blanks (CCBs)

The following field QA/QC samples were collected and analyzed:

- One field duplicate per 10 field samples collected
- One MS/MSD (extra sample volume) per 20 field samples collected
- Trip blanks included with each cooler containing VOC samples.

Samples were stored in coolers on wet ice, transported, and hand delivered to the analytical laboratory under chain-of-custody documentation.

### 3.0 EVALUATION OF MEASUREMENT QUALITY OBJECTIVES

For each analytical method, laboratory QA/QC results were compared to the established acceptance limits. The parameters reviewed for each are outlined in the following subsections.

#### 3.1 PRECISION

Precision was quantitatively evaluated by reviewing the relative percent differences (RPDs) for the following QA/QC samples:

- MS/MSDs
- Matrix duplicate (metals)
- LCS/LCSDs
- Laboratory duplicate samples
- Serial dilution (metals)
- Field duplicate samples

Refer to Worksheet #12 (Method Performance Criteria Table) and Worksheet #28 (QC Samples Table) for QC samples analyzed and criteria limits.

##### 3.1.1 February 2012

**VOCs** – VOCs precision QA/QC were acceptable.

**SVOCs** – SVOCs precision QA/QC were acceptable with the exception of the LCS/LCSD RPD for benzidine (27%), benzoic acid (116%), 2-nitroaniline (25%), and 4-nitrophenol (27%) were outside the acceptable limit and was qualified “UJ” as not detected, estimated quantitation limit in sample JP-M13-GWMWAEHA14R.

**Explosives** – Explosives precision QA/QC were acceptable.

**TAL Metals** – TAL metals precision QA/QC were acceptable with the exception of the serial dilution in sample M13LMWAEHA14R for potassium (12%). Potassium was qualified “J” as estimated in the following samples:

- JP-M13-GWMW126R
- JP-M13-GWMW362
- JP-M13-GWMW806
- JP-M13-GWMW807
- JP-M13-GWMW808
- JP-M13-GWMW809
- JP-M13-GWMW999

**Sulfate** – Sulfate precision QA/QC were acceptable.

**Nitrate** – Nitrate precision QA/QC were acceptable.

### 3.1.2 April 2012

**VOCs** – VOCs precision QA/QC were acceptable.

**SVOCs** – SVOCs precision QA/QC were acceptable with the exception of the MS/MSD (JP-M13-GWMW126R) RPD for n-nitrosodimethylamine (65%) and benzoic acid (32%). N-nitrosodimethylamine and benzoic acid were not detected in the subject sample, therefore, no qualifiers were added to the data.

The ICV %RSDs were outside the acceptable limit for the following compounds:

- N-nitrosodimethylamine (33.0%)
- 3&4-methylphenol (19.0%)
- dibenzofuran (17.0%)
- Di-n-butylphthalate (17.0%)
- Benzo(k)fluoranthene (22.0%)

If the above listed compound was detected in a sample listed below, it was qualified “J” as estimated.

- JP-M13-GWMW126R
- JP-M13-GWMW362
- JP-M13-GWMW806
- JP-M13-GWMW807
- JP-M13-GWMW808
- JP-M13-GWMW809
- JP-M13-GWMW999
- JP-M11-GWMW335
- JP-M11-GWMW802
- JP-M11-GWMW805

The ICV %RSDs associated with sample JP-M11-GWMW336 were outside the acceptable limit for the following compounds:

- Benzoic acid (55.0%)
- 2,4-dinitrophenol (19.0%)

If detected, the compound was qualified “J” as estimated.

**Explosives** – Explosives precision QA/QC were acceptable with the following exceptions discussed below.

The difference between detected results between parent sample JP-M13-GWMW362 and duplicate sample JP-M13-GWMW999 were greater than the acceptable limits for

2-nitrotoluene (1.76 micrograms per liter [ug/L]) and 4-nitrotoluene (1.59 ug/L). Detections of these compounds for these two samples were flagged as “J” for estimated.

**TAL Metals** – TAL metals precision QA/QC were acceptable.

**Sulfate** – Sulfate precision QA/QC were acceptable.

**Nitrate** – Nitrate precision QA/QC were acceptable.

### 3.2 ACCURACY

Accuracy was quantitatively evaluated by comparing the percent recovery (%R) or percent difference (%D) for the following QA/QC samples or parameters:

- Surrogate spikes (VOCs and SVOCs)
- Internal standards (VOCs and SVOCs)
- ICVs
- CCVs
- MS/MSDs
- LCSs
- ICSs (metals)

Refer to Worksheet #12 (Method Performance Criteria Table) and Worksheet #28 (QC Samples Table) for QC samples analyzed and criteria limits.

#### 3.2.1 February 2012

**VOCs** – The CCV %D was outside the acceptable limit for 2-butanone (24.9%), trans-1,3-dichloropropene (22.5%), 2-hexanone (34.4%), hexachlorobutadiene (28.5%), and 1,2,3-trichlorobenzene (32.3%). These compounds were not detected and were qualified “UJ” as not detected, estimated quantitation limit in the following samples:

- JP-M13-GWMW126R
- JP-M13-GWMW362
- JP-M13-GWMW806
- JP-M13-GWMW807
- JP-M13-GWMW808
- JP-M13-GWMW809
- JP-M13-GWMW999
- Trip Blank

The CCV %D was outside the acceptable limit for dichlorodifluoromethane (25.8%), vinyl acetate (20.3%), cis-1,3-dichloropropene (27.3%), 4-methyl-2-pentanone (26.8%), 1,1,1-trichloroethane (32.9%), 1,1,2-trichloroethane (22.5%), 2-hexanone (29.6%), 1,2-dibromomethane (24.6%), 1,1,2,2-tetrachloroethane (21.9%), n-propylbenzene (23.5%), hexachlorobutadiene (30.6%), and 1,2,3-trichlorobenzene (32.5%). These

compounds were not detected and were qualified “UJ” as not detected, estimated quantitation limit in the following samples:

- JP-M13-GWAEHA14R
- JP-M13-GWAEHA15

The second source calibration standard %Ds were outside the acceptable limit for chloromethane (21.7%) and dichlorodifluoromethane (27.6%). These compounds were not detected and were qualified “UJ” as not detected, estimated quantitation limit in the following samples:

- JP-M13-GWMW126R
- JP-M13-GWMW362
- JP-M13-GWMW806
- JP-M13-GWMW807
- JP-M13-GWMW808
- JP-M13-GWMW809
- JP-M13-GWMW999
- Trip Blank
- JP-M13-GWAEHA14R
- JP-M13-GWAEHA15

The MS/MSD (JP-M13-GWMW808) %Rs were outside acceptable limits for the following compounds:

- Vinyl acetate (123% MS)
- 2-hexanone (131% MSD)
- 1,1,2-trichloroethane (131%, 129%)

These compounds were not detected and therefore qualification was not required..

The LCS %R for 1,1,2-trichloroethane (129%) was above the acceptable limit. This compound (1,1,2-trichloroethane) was not detected in the associated samples, therefore qualification was not necessary.

The LCS %R for vinyl acetate (125%) was above the acceptable limit. Vinyl acetate was not detected in associated samples and no qualifiers were added to the data.

**SVOCs** – The CCV %Ds were outside the acceptable limits for the following compounds:

- 4-chlorophenyl-phenyl ether (20.2%)
- 2,4-dimethylphenol (21.5%)
- 2-methylnaphthalene (23.4%)
- 2,4,6-trichlorophenol (22.2%)
- 2-chloronaphthalene (20.6%)
- Acenaphthene (20.5%)

- 2,4-dinitrophenol (25.8%)
- 4-nitrophenol (20.5%)
- Fluorine (22.1%)
- N-nitrosodiphenylamine (23.8%)
- Hexachlorobenzene (24.0%)
- Phenanthrene (21.9%)
- Anthracene (21.7%)
- Carbazole (20.5%)
- Benzo(a)anthracene (21.8%)

These compounds were not detected and therefore were qualified “UJ” as not detected, estimated quantitation limit, in the following samples:

- JP-M13-GWMW126R
- JP-M13-GWMW362
- JP-M13-GWMW806
- JP-M13-GWMW807
- JP-M13-GWMW808
- JP-M13-GWMW809
- JP-M13-GWMW999
- Trip Blank
- JP-M13-GWAEHA14R
- JP-M13-GWAEHA15

The ICV %D was outside the acceptable limit for 3&4-methylphenol (17.0%), benzoic acid (25.0%), fluorine (16.0%), butylbenzylphthalate (18.0%), bis(2-ethylhexyl)phthalate (20.0%), and benzo(k)fluoranthene (19.0%). None of these compounds were detected and were qualified “UJ” as not detected, estimated quantitation limit in the following samples:

- JP-M13-GWMW126R
- JP-M13-GWMW362
- JP-M13-GWMW806
- JP-M13-GWMW807
- JP-M13-GWMW808
- JP-M13-GWMW809
- JP-M13-GWMW999
- Trip Blank
- JP-M13-GWAEHA14R
- JP-M13-GWAEHA15

The second source calibration standard %Ds were outside the acceptable limit for bis(2-chloroethyl)ether (25.5%). This compound was not detected and was qualified “UJ” as not detected, estimated quantitation limit, in the following samples:

- JP-M13-GWAEHA14R
- JP-M13-GWAEHA15

The MS/MSD %Rs were outside the acceptable limits for the following compounds:

- Benzo(a)pyrene (116% MS, 120% MSD)
- Di-n-octylphthalate (141% MSD)

These compounds were not detected and were qualified “UJ” as not detected, estimated quantitation limit in the associated sample JP-M13-GWMW808.

The surrogate spike %R recoveries were all acceptable with the exception of 2-fluorophenol (3%), phenol-d5 (7%), nitrobenzene (5%), and 2-fluorophenol (38%) associated with SDG 500-44555-1 in sample JP-M13-GWAEHA14R. All detected compounds associated with these surrogates were qualified as R and non-detect results were flagged as “J” in the following associated samples. However, this sample were re-run and surrogate recoveries were acceptable. As a result, the re-run analyses were reported as estimated.

Internal standard areas and retention times were acceptable.

**Explosives** – Explosives accuracy QA/QC were acceptable with the following exceptions.

The MS/MSD %Rs were outside the acceptable limits for the following compounds:

- HMX (133% MS, 134% MSD)
- 1,3,5-Trinitrobenzene (142% MS)
- 4-Nitrotoluene (137% MS, 137% MSD)

These compounds, associated with sample JP-M13-GWMW808, were not detected and no qualifiers were necessary.

**TAL Metals** – TAL Metals accuracy QA/QC were acceptable

**Sulfate** – Sulfate accuracy QA/QC were acceptable

**Nitrate** – Nitrate accuracy QA/QC were acceptable.

### 3.2.2 April 2012

**VOCs** - The %Ds in the CCV were outside the acceptable limit for the following compounds:

- Isopropylbenzene (20.4%)

Isopropylbenzene was not detected and was qualified “UJ” as not detected, estimated quantitation limit, in the following samples:

- JP-M13-GWMW126R
- JP-M13-GWMW362
- JP-M13-GWMW806
- JP-M13-GWMW807
- JP-M13-GWMW808
- JP-M13-GWMW809
- JP-M13-GWMW999
- JP-M11-GWMW335
- JP-M11-GWMW336
- JP-M11-GWMW802
- JP-M11-GWMW805
- Trip Blanks

**SVOCs** - The %Ds in the CCV were outside the acceptable limit for the following compounds:

- 2-methylnaphthalene (20.3%)
- dibenzofuran (21.3%)
- Di-n-butylphthalate (20.5%)

The above compounds were not detected and were qualified “UJ” as not detected, estimated quantitation limit, in the following samples:

- JP-M13-GWMW126R
- JP-M13-GWMW362
- JP-M13-GWMW806
- JP-M13-GWMW807
- JP-M13-GWMW808
- JP-M13-GWMW809
- JP-M13-GWMW999

The %Ds in the CCV were outside the acceptable limit for the following compounds:

- N-nitrosodimethylamine (41.8%)
- Benzoic acid (44.4%)
- 2,4-dinitrophenol (32.5%)
- 4-nitrophenol (25.6%)

The above compounds were not detected and were qualified “UJ” as not detected, estimated quantitation limit, in the following samples:

- JP-M11-GWMW336

The second source calibration standard %Ds were outside the acceptable limit for 2-methylnaphthalene (20.3%), dibenzofuran (21.3%), and di-n-butylphthalate (20.5%). These compounds were not detected and were qualified “UJ” as not detected, estimated quantitation limit in the following samples:

- JP-M11-GWMW802
- JP-M11-GWMW805
- JP-M11-GWMW335

The second source calibration standard %Ds was outside the acceptable limit for benzoic acid (125.4%). This compound was not detected and was qualified “UJ” as not detected, estimated quantitation limit, in the following samples:

- JP-M11-GWMW336

**Explosives** – The CCV %D for n-nitrotoluene (17.5%) was outside the acceptable limits. When not detected, n-nitrotoluene was qualified “UJ” and “J” for detected results in the following samples associated with SDG 500-45457-1:

- JP-OA-GWMW118
- JP-OA-GWMW119
- JP-OA-GWMW117

The CCV %D for 2,4,6-trinitrotoluene (16.6%) was outside the acceptable limits. Non-detect sample results were qualified “UJ” and samples with detection were qualified “J” in the following sample associated with SDG 500-45518-1 and 500-45519-1:

- JP-M13-GWMW807
- JP-M06-GWMW654
- JP-M11-GWMW335
- JP-M11-GWMW336
- JP-M11-GWMW802
- JP-M11-GWMW805

The LCS %R for HMX (116%) was above the acceptable limit. HMX detections were flagged with “J” for the following samples were detected:

- JP-L1-GWMW173-0412
- JP-L1-GWMW174-0412
- JP-L1-GWMWWES3-0412
- JP-L3-GWMW410-0412
- JP-L3-GWMW412-0412
- JP-L3-GWMW630-0412
- JP-L3-GWMW631-0412
- JP-L3-GWMW633-0412
- JP-L3-GWMW999-0412
- JP-L3-SW557-0412
- JP-L3-SW558-0412
- JP-L3-SW777-0412
- JP-L1-GWMW131
- JP-L1-GWWES1

- JP-L1-SW550
- JP-OA-GWMW118
- JP-OA-GWMW119
- JP-OA-GWMW117
- JP-L3-SW004-0412

The %D between the duel columns for samples with detections were outside of the acceptance criteria for 4-amino-2,6-dinitrotoluene (47.9%) and 2-amino-4,6-dinitrotoluene (53.3%) associated with sample JP-L3-GWMW630-0412, 4-amino-2,6-dinitrotoluene (61.7%) and 2-amino-4,6-dinitrotoluene (58.1%) associated with sample JP-L3-GWMW999-0412, and 1,3,5-trinitrobenzene (51.3%) associated with sample JP-L3-GWMW412-0412 for SDG 500-45420-1.

The %D between the duel columns for samples with detections were outside of the acceptance criteria for 1,3-dinitrobenzene (130.0%) associated with sample JP-L1-GWMW131 and 4-amino-2,6-dinitrotoluene (63.5%) and 1,3,5-trinitrobenzene (189.8%) associated with sample JP-L1-GWWES1 for SDG 500-45457-1.

The %D between the duel columns for samples with detections was outside of the acceptance criteria for 2-nitrotoluene (79.0%) associated with sample JP-M13-GWMW362 for SDG 500-45518-1.

The %D between the duel columns for samples were outside of the acceptance criteria for RDX (182.3%) and 3-nitrotoluene (149.1%) associated with sample JP-M06-MWGW654 for SDG 500-45519-1.

The %D between the duel columns for samples were outside of the acceptance criteria for the following associated with SDG 500-45521-1:

- 2,4-dinitrotoluene (113.0%) associated with sample JP-M06-MWGW162R
- 4-amino-2,6-dinitrotoluene (61.5%) and 2-amino-4,6-dinitrotoluene (60.2%) associated with sample JP-M06-MWGW212R
- 2,6-dinitrotoluene (146.1%) and 2,4-dinitrotoluene (176.1%) associated with sample JP-M06-MWGW318
- 2,4,6-trinitrotoluene (129.6%) associated with sample JP-M06-MWGW319
- 4-amino-2,6-dinitrotoluene (67.5%) associated with sample JP-M06-GWMW652
- 4-amino-2,6-dinitrotoluene (71.9%) and 4-nitrotoluene (57.2%) associated with sample JP-M06-GWMW994

All detections associated with these compounds and samples above were qualified with “J”.

The surrogate spike %R recoveries were all acceptable with the exception of 1,2-dinitrobenzene (201%). All detected compounds associated with the following compounds were qualified as “J”:

- JP-M06-GWMW318

**TAL Metals** – The MSD (JP-M13-GWMW126R) %R for magnesium (70%), sodium (76%), and mercury (77%) were less than the acceptable limits. These metals were qualified “J” as estimated for detections and UJ for non-detects in the following samples:

- JP-M13-GWMW126R
- JP-M13-GWMW362
- JP-M13-GWMW806
- JP-M13-GWMW807
- JP-M13-GWMW808
- JP-M13-GWMW809
- JP-M13-GWMW999

**Sulfate** - Sulfate accuracy QA/QC were acceptable.

**Nitrate** – Nitrate accuracy QA/QC were acceptable.

Accuracy was also quantitatively evaluated by reviewing concentrations of the following QA/QC samples:

- ICBs
- CCBs
- Method blanks
- Trip blanks

### 3.2.3 February 2012

**VOCs** – VOCs were not detected in associated blanks.

**SVOCs** – SVOCs were not detected in associated blanks.

**Explosives** – Explosives were not detected in associated blanks.

**TAL Metals** – The following metals were detected in method blanks, ICBs, or CCBs:

- antimony (0.00357 milligrams per liter [mg/L])
- barium (0.000520 mg/L and 0.0664 mg/L)
- lead (0.00175 mg/L and 0.0032 mg/L)

Antimony was qualified “U” as not detected at the reported concentration in the following samples:

- JP-M13-GWMW362 (0.0035 U)
- JP-M13-GWMW807 (0.0030 U)

- JP-M13-GWMW809 (0.0028 U)
- JP-M13-GWMW999 (0.0031 U)
- JP-M13-GWMW808 (0.0033 U)

Lead was qualified “U” as not detected at the reported concentration in the following samples:

- JP-M13-GWMW362 (0.0016 U)
- JP-M13-GWMW126R (0.0016 U)
- JP-M13-GWMW999 (0.0016 U)
- JP-M13-GWMW807 (0.0017 U)

Qualifiers were not added to the data for barium because either the sample concentration was greater than five times the blank concentration or the analyte was not detected.

**Sulfate** – Sulfate was detected in the following blanks:

- ICB/CCB (0.0976 mg/L)

Sulfate was not qualified based on blank contamination because all sample concentrations were greater than five times the blank concentration or sulfate was not detected.

**Nitrate** – Nitrate was not detected in associated blanks.

### 3.2.4 April 2012

**VOCs** – VOCs were not detected in associated blanks.

**SVOCs** – SVOCs were not detected in associated blanks.

**Explosives** – Explosives were not detected in associated blanks.

**TAL Metals** – The following metals were detected in method blanks, ICBs, or CCBs:

- copper (0.00549 mg/L)

Copper was qualified “U” as not detected at the reported concentration in the following samples:

- JP-L3-GWMW412-0412 (0.026U)
- JP-L3-GWMW630-0412 (0.027U)
- JP-L3-GWMW631-0412 (0.015U)
- JP-L3-GWMW633-0412 (0.023U)
- JP-L3-GWMW999-0412 (0.020U)
- JP-L3-SW557-0412 (0.023U)

- JP-L3-SW558-0412 (0.0066U)
- JP-L3-SW777-0412 (0.0041U)

The following metals were detected in method blanks, ICBs, or CCBs:

- copper (0.00557 mg/L)
- calcium (0.100 mg/L)
- zinc (0.00582 mg/L)

Copper was qualified “U” as not detected at the reported concentration in the following samples:

- JP-L3-SW004-0412 (0.018U)

**Sulfate** – Sulfate was not detected in associated blanks.

**Nitrate** – Nitrate was not detected in associated blanks.

### 3.3 REPRESENTATIVENESS

Representativeness was evaluated through a review of the following QA/QC elements:

- Sample preservation
- Sample holding times
- Compliance with sample collection, handling, and analysis methods specified in the Work Plan

Refer to QAPP Worksheets # 21 through # 27 for evaluation criteria related to representativeness.

#### 3.3.1 February 2012

**VOCs** – Representativeness was acceptable.

**SVOCs** – Representativeness was acceptable. However, sample JP-M13-GWMWAEHA-14R was reanalyzed (original analysis reported low surrogate recovery) outside of the acceptable hold time. Detections were qualified with “J” and non-detects were qualified with UJ as a result.

**Explosives** – Representativeness was acceptable.

**TAL Metals** – Representativeness was acceptable.

**Sulfate** – Representativeness was acceptable.

**Nitrate** – Representativeness was acceptable.

### **3.3.2 April 2012**

**VOCs** – Representativeness was acceptable.

**SVOCs** – Representativeness was acceptable.

**Explosives** – Representativeness was acceptable.

**TAL Metals** – Representativeness was acceptable.

**Nitrate** – Representativeness was acceptable. However samples JP-M13-GWMW999, JP-M13-GWMW809, JP-M13-GWMW806, and JP-M13-GWMW807 were reanalyzed outside of the acceptable hold time. Detections were qualified with “J” and non-detects were qualified with UJ.

**Sulfate** – Representativeness was acceptable.

## **3.4 COMPARABILITY**

Comparability was qualitatively evaluated through a review of the following QA/QC elements:

- Sample collection and handling procedures
- Sample preparation, analysis, and quantitation procedures
- Units of measure

Refer to QAPP Worksheets # 21 through # 27 for evaluation criteria related to comparability.

Comparability was acceptable for the February and April 2012 sampling events.

## **3.5 COMPLETENESS**

Completeness was calculated by dividing the number of acceptable sample results by the total number of scheduled sample results. The completeness goal for holding times was 100%. Completeness goals for holding times were met for all analytes in the April 2012 sampling round. The completeness goal for holding times for February 2012 samples was 97.7% since the SVOC results were re-run for sample JP-M13-GWAEHA14R outside of hold times.

The laboratory completeness goal for the number of acceptable sample results compared to the total sample results is 95%. Only results qualified “R” as unusable were considered unacceptable sample results for calculating laboratory completeness. Sample results qualified “J” as estimated, “U” as not detected, or “UJ” as not detected estimated quantitation limit were considered quantitative and acceptable.

No analytes were qualified “R” as unusable for the February and April 2012 sampling rounds with the exception of naphthalene due to the low biased surrogate recoveries for sample JP-M13-GWMWAEHA-14R (sampled March 1, 2012 associated with the February 2012 samples). However, this sample was reanalyzed and the re-run analyses resulted in no rejected results. Completeness was 100% for February 2012 and 100% for April 2012. Data usability was 100% for the February and April 2012 sampling rounds.

Refer to QAPP Worksheet #37 for the data usability criteria.

### **3.6 SENSITIVITY**

Sensitivity was evaluated by comparing method reporting limits (MRLs) with appropriate criteria. In samples not requiring dilutions, adequate sensitivity was demonstrated with MRLs equal to or less than the associated criteria.

Refer to QAPP Worksheet #15 the Reference Limits and Evaluation Table for compound specific MRLs, method detection limits, and project action limits.

### **3.7 TRACEABILITY**

Traceability was evaluated by reviewing field documentation, chain-of-custody documentation, and analytical reports. Each sample was found to be traceable from collection through analysis.

### **3.8 DATA QUALIFIERS**

Refer to Tables 3.1 through 3.5 for summaries of groundwater and surface water data. Refer to Appendix B2 for data validation reports.

### **3.9 CONCLUSIONS**

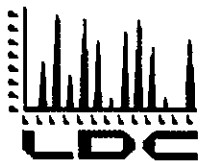
As discussed in section 3.5, completeness goals were met for the February and April 2012 analytical data. The data complies with contract requirements. The estimated data qualified “J” or “UJ” and blank qualified data qualified “U” which does not meet QA criteria are considered usable and do not negatively impact the project objectives. There were no biases or trends observed in this dataset.

#### 4.0 REFERENCES

- DoD, 2006. *Quality Systems Manual for Environmental Laboratories, Final Version 3*, DoD Environmental Data Quality Workgroup. January 2006.
- MWH, 2011. *Final Quality Assurance Project Plan (QAPP) JOAAP Environmental Remediation*, MWH America's Inc. (MWH), March 2011.
- USEPA, 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods Third Edition*. November 1986.
- USEPA, 2008. *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*. June 2008.
- USEPA, 2010. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review*. January 2010.

**B2 - DATA VALIDATION REPORTS – LABORATORY DATA CONSULTANTS  
(LDC)**

**LDC Validation Report #27391**  
**(February 2012 Samples)**



## Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437

Web [www.lab-data.com](http://www.lab-data.com)

Fax 760.634.0439

Toltest.  
5201 Jewell Lane  
Poducah KY 42001  
ATTN: Mr. Gary Reside

April 11, 2012

SUBJECT: JOAAP-GW, Data Validation

Dear Mr. Reside,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on March 29, 2012. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 27391:**

| <b><u>SDG #</u></b> | <b><u>Fraction</u></b>                                     |
|---------------------|--|
| 500-44539-1         | Volatiles, Semivolatiles, Dissolved Metals, Wet Chemistry, |
| 500-44555-1         | Explosives   |

The data validation was performed under EPA Level III guidelines. The analyses were validated using the following documents, as applicable to each method:

- Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. Rev. 0 July 2009
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1, April 2009
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink  
Project Manager

## Level III EDD

## Level III EDD

Level III EDD

**Laboratory Data Consultants, Inc.  
Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** February 29, 2012  
**LDC Report Date:** April 5, 2012  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-44539-1

**Sample Identification**

JP-M13-GWMW126R  
JP-M13-GWMW362  
JP-M13-GWMW806  
JP-M13-GWMW807  
JP-M13-GWMW809  
JP-M13-GWMW999  
JP-M13-GWMW808  
TRIP BLANK  
JP-M13-GWMW808MS  
JP-M13-GWMW808MSD

## Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination ( $r^2$ ) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds with the following exceptions:

| Date    | Compound   | %D                                   | Associated Samples                | Flag                                    | A or P |
|---------|--|--------------------------------------|-----------------------------------|---|--------|
| 3/12/12 | 2-Butanone<br>trans-1,3-Dichloropropene<br>2-Hexanone<br>Hexachlorobutadiene<br>1,2,3-Trichlorobenzene | 24.9<br>22.5<br>34.4<br>28.5<br>32.3 | All samples in SDG<br>500-44539-1 | J (all detects)<br>UJ (all non-detects) | A      |

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds with the following exceptions:

| Date    | Compound                                 | %D           | Associated Samples                | Flag   | A or P |
|---------|--|--------------|-----------------------------------|--|--------|
| 2/20/12 | Dichlorodifluoromethane<br>Chloromethane | 27.6<br>21.7 | All samples in SDG<br>500-44539-1 | J (all detects)<br>UJ (all non-detects)<br>J (all detects)<br>UJ (all non-detects) | A      |

All of the continuing calibration relative response factors (RRF) for were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

Sample "TRIP BLANK" was identified as a trip blank. No volatile contaminants were found.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| Spike ID<br>(Associated<br>Samples)      | Compound   | MS (%R)<br>(Limits)               | MSD (%R)<br>(Limits)                         | RPD<br>(Limits) | Flag  | A or P |
|--|--|-----------------------------------|--|-----------------|---|--------|
| JP-M13-GWMW808MS/MSD<br>(JP-M13-GWMW808) | Vinyl acetate<br>2-Hexanone<br>1,1,2-Trichloroethane | 123 (45-121)<br>-<br>131 (75-125) | 123 (45-121)<br>131 (55-130)<br>129 (75-125) | -<br>-<br>-     | J (all detects)<br>J (all detects)<br>J (all detects) | A      |

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

| LCS ID       | Compound              | %R (Limits)  | Associated<br>Samples         | Flag            | A or P |
|--------------|-----------------------|--------------|-------------------------------|-----------------|--------|
| 500-142990/5 | 1,1,2-Trichloroethane | 129 (75-125) | All samples in SD 500-44539-1 | J (all detects) | P      |

## **IX. Regional Quality Assurance and Quality Control**

Not applicable.

## **X. Internal Standards**

All internal standard areas and retention times were within QC limits.

## **XI. Target Compound Identifications**

Raw data were not reviewed for this SDG.

## **XII. Compound Quantitation and RLs**

Raw data were not reviewed for this SDG.

## **XIII. Tentatively Identified Compounds (TICs)**

Raw data were not reviewed for this SDG.

## **XIV. System Performance**

Raw data were not reviewed for this SDG.

## **XV. Overall Assessment of Data**

Data flags are summarized at the end of this report if data has been qualified.

## **XVI. Field Duplicates**

Samples JP-M13-GWMW809 and JP-M13-GWMW999 were identified as field duplicates. No volatiles were detected in any of the samples.

**JOAAP-GW****Volatiles - Data Qualification Summary - SDG 500-44539-1**

| SDG         | Sample  | Compound   | Flag   | A or P | Reason                                   |
|-------------|---|--|--|--------|--|
| 500-44539-1 | JP-M13-GWMW126R<br>JP-M13-GWMW362<br>JP-M13-GWMW806<br>JP-M13-GWMW807<br>JP-M13-GWMW809<br>JP-M13-GWMW999<br>JP-M13-GWMW808<br>TRIP BLANK | 2-Butanone<br>trans-1,3-Dichloropropene<br>2-Hexanone<br>Hexachlorobutadiene<br>1,2,3-Trichlorobenzene | J (all detects)<br>UJ (all non-detects)  | A      | Continuing calibration (%D)              |
| 500-44539-1 | JP-M13-GWMW126R<br>JP-M13-GWMW362<br>JP-M13-GWMW806<br>JP-M13-GWMW807<br>JP-M13-GWMW809<br>JP-M13-GWMW999<br>JP-M13-GWMW808<br>TRIP BLANK | Dichlorodifluoromethane<br><br>Chloromethane   | J (all detects)<br>UJ (all non-detects)<br>J (all detects)<br>UJ (all non-detects) | A      | Continuing calibration (ICV %D)          |
| 500-44539-1 | JP-M13-GWMW808  | Vinyl acetate<br>2-Hexanone<br>1,1,2-Trichloroethane   | J (all detects)<br>J (all detects)<br>J (all detects)                              | A      | Matrix spike/Matrix spike duplicate (%R) |
| 500-44539-1 | JP-M13-GWMW126R<br>JP-M13-GWMW362<br>JP-M13-GWMW806<br>JP-M13-GWMW807<br>JP-M13-GWMW809<br>JP-M13-GWMW999<br>JP-M13-GWMW808<br>TRIP BLANK | 1,1,2-Trichloroethane  | J (all detects)  | P      | Laboratory control samples (%R)          |

**JOAAP-GW****Volatiles - Laboratory Blank Data Qualification Summary - SDG 500-44539-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Volatiles - Field Blank Data Qualification Summary - SDG 500-44539-1**

No Sample Data Qualified in this SDG

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-44539-1

Date Sampled: 02/29/2012 1000

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8260B VOC

|                  |                 |                 |            |                        |            |
|------------------|-----------------|-----------------|------------|------------------------|------------|
| Analysis Method: | 8260B           | Analysis Batch: | 500-142990 | Instrument ID:         | CMS18      |
| Prep Method:     | 5030B           | Prep Batch:     | N/A        | Lab File ID:           | 44539-01.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 5 mL       |
| Analysis Date:   | 03/13/2012 0055 |                 |            | Final Weight/Volume:   | 5 mL       |
| Prep Date:       | 03/13/2012 0055 |                 |            |                        |            |

| Analyte                     | Result (ug/L)  | Qualifier | MDL  | RL  |
|-----------------------------|----------------|-----------|------|-----|
| Acetone                     | <5.0           |           | 1.9  | 5.0 |
| Benzene                     | <1.0           |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0           |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0           |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0           |           | 0.23 | 1.0 |
| Bromoform                   | <1.0           |           | 0.45 | 1.0 |
| Bromomethane                | <1.4           |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0 <i>US</i> |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0           |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0           |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0           |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0           |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0           |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0           |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0           |           | 0.25 | 1.0 |
| Chloroethane                | <1.4           |           | 0.33 | 1.4 |
| Chloroform                  | <1.0           |           | 0.25 | 1.0 |
| Chloromethane               | <1.0 <i>US</i> |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0           |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6           |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0           |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0           |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0           |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0           |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0           |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0 <i>US</i> |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0           |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0           |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0           |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0           |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0           |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0           |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0           |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0           |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0           |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0           |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0 <i>US</i> |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0           |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0 <i>US</i> |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0 <i>US</i> |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0           |           | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0           |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0           |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0           |           | 0.79 | 5.0 |

*024/10/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-44539-1

Date Sampled: 02/29/2012 1000

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8260B VOC

|                  |                 |                 |            |                        |            |
|------------------|-----------------|-----------------|------------|------------------------|------------|
| Analysis Method: | 8260B           | Analysis Batch: | 500-142990 | Instrument ID:         | CMS18      |
| Prep Method:     | 5030B           | Prep Batch:     | N/A        | Lab File ID:           | 44539-01.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 5 mL       |
| Analysis Date:   | 03/13/2012 0055 |                 |            | Final Weight/Volume:   | 5 mL       |
| Prep Date:       | 03/13/2012 0055 |                 |            |                        |            |

| Analyte                   | Result (ug/L)  | Qualifier | MDL  | RL  |
|---------------------------|----------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0           |           | 0.28 | 1.0 |
| Naphthalene               | <1.0           |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0           |           | 0.19 | 1.0 |
| Styrene                   | <1.0           |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0           |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0           |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0           |           | 0.22 | 1.0 |
| Toluene                   | <1.0           |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0 <i>US</i> |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0           |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0           |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0           | *         | 0.30 | 1.0 |
| Trichloroethene           | <1.0           |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0           |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2           |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0           |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0           |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0           |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0           |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0           |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0           |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 102  |           | 75 - 120          |
| Dibromofluoromethane         | 109  |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 91   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 98   |           | 85 - 120          |

*024/10/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-44539-2

Date Sampled: 02/29/2012 1120

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8260B VOC

|                  |                 |                 |            |                        |            |
|------------------|-----------------|-----------------|------------|------------------------|------------|
| Analysis Method: | 8260B           | Analysis Batch: | 500-142990 | Instrument ID:         | CMS18      |
| Prep Method:     | 5030B           | Prep Batch:     | N/A        | Lab File ID:           | 44539-02.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 5 mL       |
| Analysis Date:   | 03/13/2012 0119 |                 |            | Final Weight/Volume:   | 5 mL       |
| Prep Date:       | 03/13/2012 0119 |                 |            |                        |            |

| Analyte                     | Result (ug/L)  | Qualifier | MDL  | RL  |
|-----------------------------|----------------|-----------|------|-----|
| Acetone                     | <5.0           |           | 1.9  | 5.0 |
| Benzene                     | <1.0           |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0           |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0           |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0           |           | 0.23 | 1.0 |
| Bromoform                   | <1.0           |           | 0.45 | 1.0 |
| Bromomethane                | <1.4           |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0 <i>us</i> |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0           |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0           |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0           |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0           |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0           |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0           |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0           |           | 0.25 | 1.0 |
| Chloroethane                | <1.4           |           | 0.33 | 1.4 |
| Chloroform                  | <1.0           |           | 0.25 | 1.0 |
| Chloromethane               | <1.0 <i>us</i> |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0           |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6           |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0           |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0           |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0           |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0           |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0           |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0 <i>us</i> |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0           |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0           |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0           |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0           |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0           |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0           |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0           |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0           |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0           |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0           |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0 <i>us</i> |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0           |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0 <i>us</i> |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0 <i>us</i> |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0           |           | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0           |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0           |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0           |           | 0.79 | 5.0 |

*02/10/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-44539-2

Date Sampled: 02/29/2012 1120

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-142990

Instrument ID: CMS18

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 44539-02.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 03/13/2012 0119

Final Weight/Volume: 5 mL

Prep Date: 03/13/2012 0119

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0 JS       |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          | *         | 0.30 | 1.0 |
| Trichloroethene           | <1.0          |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 98   |           | 75 - 120          |
| Dibromofluoromethane         | 103  |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 90   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 103  |           | 85 - 120          |

02/10/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-44539-3

Date Sampled: 02/29/2012 1300

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-142990

Instrument ID: CMS18

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 44539-03.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 03/13/2012 0144

Final Weight/Volume: 5 mL

Prep Date: 03/13/2012 0144

| Analyte                     | Result (ug/L)  | Qualifier | MDL  | RL  |
|-----------------------------|----------------|-----------|------|-----|
| Acetone                     | <5.0           |           | 1.9  | 5.0 |
| Benzene                     | <1.0           |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0           |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0           |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0           |           | 0.23 | 1.0 |
| Bromoform                   | <1.0           |           | 0.45 | 1.0 |
| Bromomethane                | <1.4           |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0 <i>us</i> |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0           |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0           |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0           |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0           |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0           |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0           |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0           |           | 0.25 | 1.0 |
| Chloroethane                | <1.4           |           | 0.33 | 1.4 |
| Chloroform                  | <1.0           |           | 0.25 | 1.0 |
| Chloromethane               | <1.0 <i>us</i> |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0           |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6           |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0           |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0           |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0           |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0           |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0           |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0 <i>us</i> |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0           |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0           |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0           |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0           |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0           |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0           |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0           |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0           |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0           |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0           |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0 <i>us</i> |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0           |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0 <i>us</i> |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0 <i>us</i> |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0           |           | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0           |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0           |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0           |           | 0.79 | 5.0 |

*02/10/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-44539-3

Date Sampled: 02/29/2012 1300

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-142990

Instrument ID: CMS18

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 44539-03.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 03/13/2012 0144

Final Weight/Volume: 5 mL

Prep Date: 03/13/2012 0144

| Analyte                   | Result (ug/L)      | Qualifier | MDL  | RL  |
|---------------------------|--------------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0               |           | 0.28 | 1.0 |
| Naphthalene               | <1.0               |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0               |           | 0.19 | 1.0 |
| Styrene                   | <1.0               |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0               |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0               |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0               |           | 0.22 | 1.0 |
| Toluene                   | <1.0               |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0 <sup>US</sup> |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0               |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0               |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0               | *         | 0.30 | 1.0 |
| Trichloroethene           | <1.0               |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0               |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2               |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0               |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0               |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0               |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0               |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0               |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0               |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 99   |           | 75 - 120          |
| Dibromofluoromethane         | 103  |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 90   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 100  |           | 85 - 120          |

024/01/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-44539-4

Date Sampled: 02/29/2012 1350

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8260B VOC

|                  |                 |                 |            |                        |            |
|------------------|-----------------|-----------------|------------|------------------------|------------|
| Analysis Method: | 8260B           | Analysis Batch: | 500-142990 | Instrument ID:         | CMS18      |
| Prep Method:     | 5030B           | Prep Batch:     | N/A        | Lab File ID:           | 44539-04.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 5 mL       |
| Analysis Date:   | 03/13/2012 0209 |                 |            | Final Weight/Volume:   | 5 mL       |
| Prep Date:       | 03/13/2012 0209 |                 |            |                        |            |

| Analyte                     | Result (ug/L) | Qualifier | MDL  | RL  |
|-----------------------------|---------------|-----------|------|-----|
| Acetone                     | <5.0          |           | 1.9  | 5.0 |
| Benzene                     | <1.0          |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0          |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0          |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0          |           | 0.23 | 1.0 |
| Bromoform                   | <1.0          |           | 0.45 | 1.0 |
| Bromomethane                | <1.4          |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0 <i>✓</i> |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0          |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0          |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0          |           | 0.24 | 1.0 |
| Carbon disulfide            | 2.4           | J         | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0          |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0          |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0          |           | 0.25 | 1.0 |
| Chloroethane                | <1.4          |           | 0.33 | 1.4 |
| Chloroform                  | <1.0          |           | 0.25 | 1.0 |
| Chloromethane               | <1.0 <i>✓</i> |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0          |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6          |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0          |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0          |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0          |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0          |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0          |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0 <i>✓</i> |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | 1.4           |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0          |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0          |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | 0.79          | J         | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0          |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0          |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0          |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0          |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0          |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0          |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0 <i>✓</i> |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0          |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0 <i>✓</i> |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0 <i>✓</i> |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0          |           | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0          |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0          |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0          |           | 0.79 | 5.0 |

*024/10/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-44539-4

Date Sampled: 02/29/2012 1350

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8260B VOC

|                  |                 |                 |            |                        |            |
|------------------|-----------------|-----------------|------------|------------------------|------------|
| Analysis Method: | 8260B           | Analysis Batch: | 500-142990 | Instrument ID:         | CMS18      |
| Prep Method:     | 5030B           | Prep Batch:     | N/A        | Lab File ID:           | 44539-04.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 5 mL       |
| Analysis Date:   | 03/13/2012 0209 |                 |            | Final Weight/Volume:   | 5 mL       |
| Prep Date:       | 03/13/2012 0209 |                 |            |                        |            |

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0          |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          | *         | 0.30 | 1.0 |
| Trichloroethene           | <1.0          |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 97   |           | 75 - 120          |
| Dibromofluoromethane         | 104  |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 91   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 97   |           | 85 - 120          |

024/10/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-44539-5

Date Sampled: 02/29/2012 1700

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8260B VOC

|                  |                 |                 |            |                        |            |
|------------------|-----------------|-----------------|------------|------------------------|------------|
| Analysis Method: | 8260B           | Analysis Batch: | 500-142990 | Instrument ID:         | CMS18      |
| Prep Method:     | 5030B           | Prep Batch:     | N/A        | Lab File ID:           | 44539-05.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 5 mL       |
| Analysis Date:   | 03/13/2012 0234 |                 |            | Final Weight/Volume:   | 5 mL       |
| Prep Date:       | 03/13/2012 0234 |                 |            |                        |            |

| Analyte                     | Result (ug/L)  | Qualifier | MDL  | RL  |
|-----------------------------|----------------|-----------|------|-----|
| Acetone                     | <5.0           |           | 1.9  | 5.0 |
| Benzene                     | <1.0           |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0           |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0           |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0           |           | 0.23 | 1.0 |
| Bromoform                   | <1.0           |           | 0.45 | 1.0 |
| Bromomethane                | <1.4           |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0 <i>JS</i> |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0           |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0           |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0           |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0           |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0           |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0           |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0           |           | 0.25 | 1.0 |
| Chloroethane                | <1.4           |           | 0.33 | 1.4 |
| Chloroform                  | <1.0           |           | 0.25 | 1.0 |
| Chloromethane               | <1.0 <i>JS</i> |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0           |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6           |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0           |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0           |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0           |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0           |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0           |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0 <i>JS</i> |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0           |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0           |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0           |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0           |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0           |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0           |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0           |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0           |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0           |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0           |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0 <i>JS</i> |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0           |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0 <i>JS</i> |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0 <i>JS</i> |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0           |           | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0           |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0           |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0           |           | 0.79 | 5.0 |

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-44539-5

Date Sampled: 02/29/2012 1700

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8260B VOC

|                  |                 |                 |            |                        |            |
|------------------|-----------------|-----------------|------------|------------------------|------------|
| Analysis Method: | 8260B           | Analysis Batch: | 500-142990 | Instrument ID:         | CMS18      |
| Prep Method:     | 5030B           | Prep Batch:     | N/A        | Lab File ID:           | 44539-05.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 5 mL       |
| Analysis Date:   | 03/13/2012 0234 |                 |            | Final Weight/Volume:   | 5 mL       |
| Prep Date:       | 03/13/2012 0234 |                 |            |                        |            |

| Analyte                   | Result (ug/L)  | Qualifier | MDL  | RL  |
|---------------------------|----------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0           |           | 0.28 | 1.0 |
| Naphthalene               | <1.0           |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0           |           | 0.19 | 1.0 |
| Styrene                   | <1.0           |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0           |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0           |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0           |           | 0.22 | 1.0 |
| Toluene                   | <1.0           |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0 <i>US</i> |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0           |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0           |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0           | *         | 0.30 | 1.0 |
| Trichloroethene           | <1.0           |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0           |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2           |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0           |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0           |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0           |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0           |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0           |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0           |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 97   |           | 75 - 120          |
| Dibromofluoromethane         | 107  |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 94   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 105  |           | 85 - 120          |

*central*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-44539-6

Date Sampled: 02/29/2012 1200

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8260B VOC

|                  |                 |                 |            |                        |            |
|------------------|-----------------|-----------------|------------|------------------------|------------|
| Analysis Method: | 8260B           | Analysis Batch: | 500-142990 | Instrument ID:         | CMS18      |
| Prep Method:     | 5030B           | Prep Batch:     | N/A        | Lab File ID:           | 44539-06.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 5 mL       |
| Analysis Date:   | 03/13/2012 0259 |                 |            | Final Weight/Volume:   | 5 mL       |
| Prep Date:       | 03/13/2012 0259 |                 |            |                        |            |

| Analyte                     | Result (ug/L)  | Qualifier | MDL  | RL  |
|-----------------------------|----------------|-----------|------|-----|
| Acetone                     | <5.0           |           | 1.9  | 5.0 |
| Benzene                     | <1.0           |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0           |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0           |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0           |           | 0.23 | 1.0 |
| Bromoform                   | <1.0           |           | 0.45 | 1.0 |
| Bromomethane                | <1.4           |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0 <i>us</i> |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0           |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0           |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0           |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0           |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0           |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0           |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0           |           | 0.25 | 1.0 |
| Chloroethane                | <1.4           |           | 0.33 | 1.4 |
| Chloroform                  | <1.0           |           | 0.25 | 1.0 |
| Chloromethane               | <1.0 <i>us</i> |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0           |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6           |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0           |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0           |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0           |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0           |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0           |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0 <i>us</i> |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0           |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0           |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0           |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0           |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0           |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0           |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0           |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0           |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0           |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0           |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0 <i>us</i> |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0           |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0 <i>us</i> |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0 <i>us</i> |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0           |           | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0           |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0           |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0           |           | 0.79 | 5.0 |

*024/10/12*

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-44539-6

Date Sampled: 02/29/2012 1200

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8260B VOC

|                  |                 |                 |            |                        |            |
|------------------|-----------------|-----------------|------------|------------------------|------------|
| Analysis Method: | 8260B           | Analysis Batch: | 500-142990 | Instrument ID:         | CMS18      |
| Prep Method:     | 5030B           | Prep Batch:     | N/A        | Lab File ID:           | 44539-06.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 5 mL       |
| Analysis Date:   | 03/13/2012 0259 |                 |            | Final Weight/Volume:   | 5 mL       |
| Prep Date:       | 03/13/2012 0259 |                 |            |                        |            |

| Analyte                   | Result (ug/L)  | Qualifier | MDL  | RL  |
|---------------------------|----------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0           |           | 0.28 | 1.0 |
| Naphthalene               | <1.0           |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0           |           | 0.19 | 1.0 |
| Styrene                   | <1.0           |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0           |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0           |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0           |           | 0.22 | 1.0 |
| Toluene                   | <1.0           |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0 <i>sk</i> |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0           |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0           |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0           |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0           |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0           |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2           |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0           |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0           |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0           |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0           |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0           |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0           |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 95   |           | 75 - 120          |
| Dibromofluoromethane         | 105  |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 92   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 104  |           | 85 - 120          |

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-44539-7

Date Sampled: 02/29/2012 1510

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8260B VOC

|                  |                 |                 |            |                        |            |
|------------------|-----------------|-----------------|------------|------------------------|------------|
| Analysis Method: | 8260B           | Analysis Batch: | 500-142990 | Instrument ID:         | CMS18      |
| Prep Method:     | 5030B           | Prep Batch:     | N/A        | Lab File ID:           | 44539-07.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 5 mL       |
| Analysis Date:   | 03/13/2012 0324 |                 |            | Final Weight/Volume:   | 5 mL       |
| Prep Date:       | 03/13/2012 0324 |                 |            |                        |            |

| Analyte                     | Result (ug/L)  | Qualifier | MDL  | RL  |
|-----------------------------|----------------|-----------|------|-----|
| Acetone                     | <5.0           |           | 1.9  | 5.0 |
| Benzene                     | <1.0           |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0           |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0           |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0           |           | 0.23 | 1.0 |
| Bromoform                   | <1.0           |           | 0.45 | 1.0 |
| Bromomethane                | <1.4           |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0 <i>us</i> |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0           |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0           |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0           |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0           |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0           |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0           |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0           |           | 0.25 | 1.0 |
| Chloroethane                | <1.4           |           | 0.33 | 1.4 |
| Chloroform                  | <1.0           |           | 0.25 | 1.0 |
| Chloromethane               | <1.0 <i>us</i> |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0           |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6           |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0           |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0           |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0           |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0           |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0           |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0 <i>us</i> |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0           |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0           |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0           |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0           |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0           |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0           |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0           |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0           |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0           |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0           |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0 <i>us</i> |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0           |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0 <i>us</i> |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0 <i>us</i> |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0           |           | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0           |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0           |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0           |           | 0.79 | 5.0 |

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-44539-7

Date Sampled: 02/29/2012 1510

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8260B VOC

|                  |                 |                 |            |                        |            |
|------------------|-----------------|-----------------|------------|------------------------|------------|
| Analysis Method: | 8260B           | Analysis Batch: | 500-142990 | Instrument ID:         | CMS18      |
| Prep Method:     | 5030B           | Prep Batch:     | N/A        | Lab File ID:           | 44539-07.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 5 mL       |
| Analysis Date:   | 03/13/2012 0324 |                 |            | Final Weight/Volume:   | 5 mL       |
| Prep Date:       | 03/13/2012 0324 |                 |            |                        |            |

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0          |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0          |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 96   |           | 75 - 120          |
| Dibromofluoromethane         | 105  |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 93   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 95   |           | 85 - 120          |

CE 4/10/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: TRIP BLANK

Lab Sample ID: 500-44539-8TB

Client Matrix: Water

Date Sampled: 02/29/2012 0000

Date Received: 03/01/2012 0947

## 8260B VOC

|                  |                 |                 |            |                        |            |
|------------------|-----------------|-----------------|------------|------------------------|------------|
| Analysis Method: | 8260B           | Analysis Batch: | 500-142990 | Instrument ID:         | CMS18      |
| Prep Method:     | 5030B           | Prep Batch:     | N/A        | Lab File ID:           | 44539-08.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 5 mL       |
| Analysis Date:   | 03/13/2012 0439 |                 |            | Final Weight/Volume:   | 5 mL       |
| Prep Date:       | 03/13/2012 0439 |                 |            |                        |            |

| Analyte                     | Result (ug/L)  | Qualifier | MDL  | RL  |
|-----------------------------|----------------|-----------|------|-----|
| Acetone                     | <5.0           |           | 1.9  | 5.0 |
| Benzene                     | <1.0           |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0           |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0           |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0           |           | 0.23 | 1.0 |
| Bromoform                   | <1.0           |           | 0.45 | 1.0 |
| Bromomethane                | <1.4           |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0 <i>us</i> |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0           |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0           |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0           |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0           |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0           |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0           |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0           |           | 0.25 | 1.0 |
| Chloroethane                | <1.4           |           | 0.33 | 1.4 |
| Chloroform                  | <1.0           |           | 0.25 | 1.0 |
| Chloromethane               | <1.0 <i>us</i> |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0           |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6           |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0           |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0           |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0           |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0           |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0           |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0 <i>us</i> |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0           |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0           |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0           |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0           |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0           |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0           |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0           |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0           |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0           |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0           |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0 <i>us</i> |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0           |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0 <i>us</i> |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0 <i>us</i> |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0           |           | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0           |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0           |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0           |           | 0.79 | 5.0 |

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: TRIP BLANK

Lab Sample ID: 500-44539-8TB

Date Sampled: 02/29/2012 0000

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-142990

Instrument ID: CMS18

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 44539-08.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 03/13/2012 0439

Final Weight/Volume: 5 mL

Prep Date: 03/13/2012 0439

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0          |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0          |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 97   |           | 75 - 120          |
| Dibromofluoromethane         | 110  |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 91   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 105  |           | 85 - 120          |

02/10/12

LDC #: 27391A1

**VALIDATION COMPLETENESS WORKSHEET**

SDG #: 500-44539-1

Level III

Laboratory: Test America, Inc.

Date: 4/4/12

Page: 1 of 1

Reviewer: BK

2nd Reviewer: ✓

**METHOD:** GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                                |    | Comments                 |
|-------|--|----|--------------------------|
| I.    | Technical holding times                        | A  | Sampling dates: 02/29/12 |
| II.   | GC/MS Instrument performance check             | A  |                          |
| III.  | Initial calibration                            | A  | $KSD \leq 30/15?$ $r^2$  |
| IV.   | Continuing calibration/ICV                     | SW | $ICV/CCV \leq 20\%$      |
| V.    | Blanks   | A  |                          |
| VI.   | Surrogate spikes                               | A  |                          |
| VII.  | Matrix spike/Matrix spike duplicates           | SW |                          |
| VIII. | Laboratory control samples                     | SW | LCS                      |
| IX.   | Regional Quality Assurance and Quality Control | N  |                          |
| X.    | Internal standards                             | A  |                          |
| XI.   | Target compound identification                 | N  |                          |
| XII.  | Compound quantitation/RL/LOQ/LODs              | N  |                          |
| XIII. | Tentatively identified compounds (TICs)        | N  |                          |
| XIV.  | System performance                             | N  |                          |
| XV.   | Overall assessment of data                     | A  |                          |
| XVI.  | Field duplicates                               | ND | FD = 5 + 6               |
| XVII. | Field blanks                                   | ND | TB = 8                   |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples: Water

|    |                   |    |                 |    |  |    |  |
|----|-------------------|----|-----------------|----|--|----|--|
| 1  | JP-M13-GWMW126R   | 11 | 500 - 142990-MB | 21 |  | 31 |  |
| 2  | JP-M13-GWMW362    | 12 |                 | 22 |  | 32 |  |
| 3  | JP-M13-GWMW806    | 13 |                 | 23 |  | 33 |  |
| 4  | JP-M13-GWMW807    | 14 |                 | 24 |  | 34 |  |
| 5  | JP-M13-GWMW809    | 15 |                 | 25 |  | 35 |  |
| 6  | JP-M13-GWMW999    | 16 |                 | 26 |  | 36 |  |
| 7  | JP-M13-GWMW808    | 17 |                 | 27 |  | 37 |  |
| 8  | TRIP BLANK        | 18 |                 | 28 |  | 38 |  |
| 9  | JP-M13-GWMW808MS  | 19 |                 | 29 |  | 39 |  |
| 10 | JP-M13-GWMW808MSD | 20 |                 | 30 |  | 40 |  |

# TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

|                              |                                 |                               |  |                         |
|------------------------------|---------------------------------|-------------------------------|--|-------------------------|
| A. Chloromethane*            | U. 1,1,2-Trichloroethane        | OO. 2,2-Dichloropropane       | III. n-Butylbenzene                        | CCCC. 1-Chlorohexane    |
| B. Bromomethane              | V. Benzene                      | PP. Bromochloromethane        | JJJ. 1,2-Dichlorobenzene                   | DDDD. Isopropyl alcohol |
| C. Vinyl chloride**          | W. trans-1,3-Dichloropropene    | QQ. 1,1-Dichloropropene       | KKK. 1,2,4-Trichlorobenzene                | EEEE. Acetonitrile      |
| D. Chloroethane              | X. Bromoform*                   | RR. Dibromomethane            | LLL. Hexachlorobutadiene                   | FFFF. Acrolein          |
| E. Methylene chloride        | Y. 4-Methyl-2-pentanone         | SS. 1,3-Dichloropropane       | MMM. Naphthalene                           | GGGG. Acrylonitrile     |
| F. Acetone                   | Z. 2-Hexanone                   | TT. 1,2-Dibromoethane         | NNN. 1,2,3-Trichlorobenzene                | HHHH. 1,4-Dioxane       |
| G. Carbon disulfide          | AA. Tetrachloroethene           | UU. 1,1,1,2-Tetrachloroethane | OOO. 1,3,5-Trichlorobenzene                | IIII. Isobutyl alcohol  |
| H. 1,1-Dichloroethene**      | BB. 1,1,2,2-Tetrachloroethane*  | VV. Isopropylbenzene          | PPP. trans-1,2-Dichloroethene              | JJJJ. Methacrylonitrile |
| I. 1,1-Dichloroethane*       | CC. Toluene**                   | WW. Bromobenzene              | QQQ. cis-1,2-Dichloroethene                | KKKK. Propionitrile     |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene*              | XX. 1,2,3-Trichloropropane    | RRR. m,p-Xylenes                           | LLLL. Ethyl ether       |
| K. Chloroform**              | EE. Ethylbenzene**              | YY. n-Propylbenzene           | SSS. o-Xylene                              | MMMM. Benzyl chloride   |
| L. 1,2-Dichloroethane        | FF. Styrene                     | ZZ. 2-Chlorotoluene           | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN.                   |
| M. 2-Butanone                | GG. Xylenes, total              | AAA. 1,3,5-Trimethylbenzene   | UUU. 1,2-Dichlorotetrafluoroethane         | OOOO.                   |
| N. 1,1,1-Trichloroethane     | HH. Vinyl acetate               | BBB. 4-Chlorotoluene          | VVV. 4-Ethyltoluene                        | PPPP.                   |
| O. Carbon tetrachloride      | II. 2-Chloroethylvinyl ether    | CCC. tert-Butylbenzene        | WWW. Ethanol                               | QQQQ.                   |
| P. Bromodichloromethane      | JJ. Dichlorodifluoromethane     | DDD. 1,2,4-Trimethylbenzene   | XXX. Di-isopropyl ether                    | RRRR.                   |
| Q. 1,2-Dichloropropane**     | KK. Trichlorofluoromethane      | EEE. sec-Butylbenzene         | YYY. tert-Butanol                          | SSSS.                   |
| R. cis-1,3-Dichloropropene   | LL. Methyl-tert-butyl ether     | FFF. 1,3-Dichlorobenzene      | ZZZ. tert-Butyl alcohol                    | TTTT.                   |
| S. Trichloroethene           | MM. 1,2-Dibromo-3-chloropropane | GGG. p-Isopropyltoluene       | AAA. Ethyl tert-butyl ether                | UUUU.                   |
| T. Dibromochloromethane      | NN. Methyl ethyl ketone         | HHH. 1,4-Dichlorobenzene      | BBB. tert-Amyl methyl ether                | VVVV.                   |

\* = System performance check compounds (SPCC) for RRF ; \*\* = Calibration check compounds (CCC) for %RSD.



## **VALIDATION FINDINGS WORKSHEET**

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

|   |   |     |  |
|---|---|-----|--|
| Y | N | N/A | Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. |
|---|---|-----|--|

|  |   |     |
|--|---|-----|
| Was a MS/MSD analyzed every 20 samples of each matrix? | N | N/A |
|--|---|-----|

| Y  | N | N/A |
|--|---|-----|
|  |   |     |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? |   |     |

[illegible]

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

LCSLCSD.1SB

**Laboratory Data Consultants, Inc.**  
**Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** February 29, 2012  
**LDC Report Date:** April 5, 2012  
**Matrix:** Water  
**Parameters:** Semivolatiles  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-44539-1

**Sample Identification**

JP-M13-GWMW126R  
JP-M13-GWMW362  
JP-M13-GWMW806  
JP-M13-GWMW807  
JP-M13-GWMW809  
JP-M13-GWMW999  
JP-M13-GWMW808  
JP-M13-GWMW808MS  
JP-M13-GWMW808MSD

## Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs) with the following exceptions:

| Date    | Compound   | %RSD   | Associated Samples                | Flag                                    | A or P |
|---------|--|--|-----------------------------------|---|--------|
| 3/15/12 | 3&4-Methylphenol<br>Benzoic acid<br>Fluorene<br>Butylbenzylphthalate<br>Bis(2-ethylhexyl)phthalate<br>Benzo(k)fluoranthene | 17.0<br>25.0<br>16.0<br>18.0<br>20.0<br>19.0 | All samples in SDG<br>500-44539-1 | J (all detects)<br>UJ (all non-detects) | A      |

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination ( $r^2$ ) were greater than or equal to 0.990 .

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds with the following exceptions:

| Date    | Compound   | %D   | Associated Samples                | Flag                                    | A or P |
|---------|--|--|-----------------------------------|---|--------|
| 3/15/12 | 4-Chlorophenyl-phenyl ether<br>2,4-Dimethylphenol<br>2-Methylnaphthalene<br>2,4,6-Trichlorophenol<br>2-Chloronaphthalene<br>Acenaphthene<br>2,4-Dinitrophenol<br>4-Nitrophenol<br>Fluorene<br>N-Nitrosodiphenylamine<br>4-Bromophenyl-phenyl ether<br>Hexachlorobenzene<br>Phenanthrene<br>Anthracene<br>Carbazole<br>Benzo(a)anthracene | 20.2<br>21.5<br>23.4<br>22.2<br>20.6<br>20.5<br>25.8<br>20.5<br>22.1<br>23.8<br>21.3<br>24.0<br>21.9<br>21.7<br>20.5<br>21.8 | All samples in SDG<br>500-44539-1 | J (all detects)<br>UJ (all non-detects) | A      |

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No semivolatile contaminants were found in the method blanks.

No field blanks were identified in this SDG.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| Spike ID<br>(Associated Samples)         | Compound                              | MS (%R)<br>(Limits) | MSD (%R)<br>(Limits)         | RPD<br>(Limits) | Flag                               | A or P |
|--|---------------------------------------|---------------------|------------------------------|-----------------|------------------------------------|--------|
| JP-M13-GWMW808MS/MSD<br>(JP-M13-GWMW808) | Benzo(a)pyrene<br>Di-n-octylphthalate | 116 (55-110)<br>-   | 120 (55-110)<br>141 (35-135) | -<br>-          | J (all detects)<br>J (all detects) | A      |

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## **IX. Regional Quality Assurance and Quality Control**

Not applicable.

## **X. Internal Standards**

All internal standard areas and retention times were within QC limits.

## **XI. Target Compound Identifications**

Raw data were not reviewed for this SDG.

## **XII. Compound Quantitation and RLs**

Raw data were not reviewed for this SDG.

## **XIII. Tentatively Identified Compounds (TICs)**

Raw data were not reviewed for this SDG.

## **XIV. System Performance**

Raw data were not reviewed for this SDG.

## **XV. Overall Assessment**

Data flags are summarized at the end of this report if data has been qualified.

## **XVI. Field Duplicates**

Samples JP-M13-GWMW809 and JP-M13-GWMW999 were identified as field duplicates. No semivolatiles were detected in any of the samples.

**JOAAP-GW**

**Semivolatiles - Data Qualification Summary - SDG 500-44539-1**

| SDG         | Sample  | Compound   | Flag                                    | A or P | Reason                                   |
|-------------|---|--|---|--------|--|
| 500-44539-1 | JP-M13-GWMW126R<br>JP-M13-GWMW362<br>JP-M13-GWMW806<br>JP-M13-GWMW807<br>JP-M13-GWMW809<br>JP-M13-GWMW999<br>JP-M13-GWMW808 | 3&4-Methylphenol<br>Benzoic acid<br>Fluorene<br>Butylbenzylphthalate<br>Bis(2-ethylhexyl)phthalate<br>Benzo(k)fluoranthene   | J (all detects)<br>UJ (all non-detects) | A      | Initial calibration (%RSD)               |
| 500-44539-1 | JP-M13-GWMW126R<br>JP-M13-GWMW362<br>JP-M13-GWMW806<br>JP-M13-GWMW807<br>JP-M13-GWMW809<br>JP-M13-GWMW999<br>JP-M13-GWMW808 | 4-Chlorophenyl-phenyl ether<br>2,4-Dimethylphenol<br>2-Methylnaphthalene<br>2,4,6-Trichlorophenol<br>2-Chloronaphthalene<br>Acenaphthene<br>2,4-Dinitrophenol<br>4-Nitrophenol<br>Fluorene<br>N-Nitrosodiphenylamine<br>4-Bromophenyl-phenyl ether<br>Hexachlorobenzene<br>Phenanthrene<br>Anthracene<br>Carbazole<br>Benzo(a)anthracene | J (all detects)<br>UJ (all non-detects) | A      | Continuing calibration (ICV %D)          |
| 500-44539-1 | JP-M13-GWMW808  | Benzo(a)pyrene<br>Di-n-octylphthalate  | J (all detects)<br>J (all detects)      | A      | Matrix spike/Matrix spike duplicate (%R) |

**JOAAP-GW**

**Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 500-44539-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Semivolatiles - Field Blank Data Qualification Summary - SDG 500-44539-1**

No Sample Data Qualified in this SDG

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-44539-1

Date Sampled: 02/29/2012 1000

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8270C SVOC

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8270C           | Analysis Batch: | 500-143421 | Instrument ID:         | CMS23     |
| Prep Method:     | 3510C           | Prep Batch:     | 500-142158 | Lab File ID:           | 44539-1.d |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 1050 mL   |
| Analysis Date:   | 03/16/2012 1722 |                 |            | Final Weight/Volume:   | 1.0 mL    |
| Prep Date:       | 03/02/2012 0915 |                 |            | Injection Volume:      | 1 uL      |

| Analyte                      | Result (ug/L)   | Qualifier | MDL   | RL   |
|------------------------------|-----------------|-----------|-------|------|
| Acenaphthene                 | <0.95 <i>US</i> |           | 0.34  | 0.95 |
| N-Nitrosodimethylamine       | <9.5            |           | 1.3   | 9.5  |
| Acenaphthylene               | <0.95           |           | 0.30  | 0.95 |
| Anthracene                   | <0.95 <i>US</i> |           | 0.30  | 0.95 |
| Benzidine                    | <38             |           | 19    | 38   |
| Benzoic acid                 | <19 <i>US</i>   |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19 <i>US</i> |           | 0.042 | 0.19 |
| Benzo[b]fluoranthene         | <0.19           |           | 0.055 | 0.19 |
| Benzo[k]fluoranthene         | <0.24 <i>US</i> |           | 0.070 | 0.24 |
| Benzo[g,h,i]perylene         | <0.95           |           | 0.40  | 0.95 |
| Benzo[a]pyrene               | <0.19           |           | 0.053 | 0.19 |
| Benzyl alcohol               | <19             |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9            |           | 0.29  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9            |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9            |           | 0.29  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.5 <i>US</i>  |           | 2.3   | 9.5  |
| 4-Bromophenyl phenyl ether   | <4.8 <i>US</i>  |           | 0.87  | 4.8  |
| Butyl benzyl phthalate       | <1.9 <i>US</i>  |           | 0.26  | 1.9  |
| Carbazole                    | <4.8 <i>US</i>  |           | 0.94  | 4.8  |
| 4-Chloroaniline              | <9.5            |           | 2.0   | 9.5  |
| 4-Chloro-3-methylphenol      | <9.5            |           | 2.1   | 9.5  |
| 2-Chloronaphthalene          | <1.9 <i>US</i>  |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.8            |           | 0.76  | 4.8  |
| 4-Chlorophenyl phenyl ether  | <4.8 <i>US</i>  |           | 0.77  | 4.8  |
| Chrysene                     | <0.48           |           | 0.13  | 0.48 |
| Dibenz(a,h)anthracene        | <0.29           |           | 0.061 | 0.29 |
| Dibenzofuran                 | <1.9            |           | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.8            |           | 0.76  | 4.8  |
| 1,2-Dichlorobenzene          | <1.9            |           | 0.28  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9            |           | 0.24  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9            |           | 0.26  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.8            |           | 0.90  | 4.8  |
| 2,4-Dichlorophenol           | <9.5            |           | 2.2   | 9.5  |
| Diethyl phthalate            | <1.9            |           | 0.42  | 1.9  |
| 2,4-Dimethylphenol           | <9.5 <i>US</i>  |           | 3.2   | 9.5  |
| Dimethyl phthalate           | <1.9            |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19             |           | 4.7   | 19   |
| 2,4-Dinitrophenol            | <19 <i>US</i>   |           | 7.1   | 19   |
| 2,4-Dinitrotoluene           | <1.3            |           | 0.29  | 1.3  |
| 2,6-Dinitrotoluene           | <0.48           |           | 0.11  | 0.48 |
| Di-n-octyl phthalate         | <9.5            |           | 2.4   | 9.5  |
| Fluoranthene                 | <0.95           |           | 0.30  | 0.95 |
| Fluorene                     | <0.95 <i>US</i> |           | 0.36  | 0.95 |
| 1,2-Diphenylhydrazine        | <4.8            |           | 0.67  | 4.8  |
| Hexachlorobenzene            | <0.48 <i>US</i> |           | 0.13  | 0.48 |
| Hexachlorobutadiene          | <4.8            |           | 1.1   | 4.8  |

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-44539-1

Date Sampled: 02/29/2012 1000

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8270C SVOC

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8270C           | Analysis Batch: | 500-143421 | Instrument ID:         | CMS23     |
| Prep Method:     | 3510C           | Prep Batch:     | 500-142158 | Lab File ID:           | 44539-1.d |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 1050 mL   |
| Analysis Date:   | 03/16/2012 1722 |                 |            | Final Weight/Volume:   | 1.0 mL    |
| Prep Date:       | 03/02/2012 0915 |                 |            | Injection Volume:      | 1 uL      |

| Analyte                   | Result (ug/L)   | Qualifier | MDL   | RL   |
|---------------------------|-----------------|-----------|-------|------|
| Hexachloroethane          | <4.8            |           | 0.92  | 4.8  |
| Indeno[1,2,3-cd]pyrene    | <0.24           |           | 0.080 | 0.24 |
| Isophorone                | <1.9            |           | 0.28  | 1.9  |
| 2-Methylnaphthalene       | <0.48 <i>US</i> |           | 0.12  | 0.48 |
| 2-Methylphenol            | <1.9            |           | 0.30  | 1.9  |
| 3 & 4 Methylphenol        | <1.9 <i>US</i>  |           | 0.42  | 1.9  |
| Naphthalene               | <0.95           |           | 0.29  | 0.95 |
| 2-Nitroaniline            | <4.8            |           | 1.0   | 4.8  |
| 3-Nitroaniline            | <9.5            |           | 2.2   | 9.5  |
| 4-Nitroaniline            | <9.5            |           | 3.7   | 9.5  |
| Nitrobenzene              | <0.95           |           | 0.43  | 0.95 |
| 2-Nitrophenol             | <9.5            |           | 2.0   | 9.5  |
| 4-Nitrophenol             | <19 <i>US</i>   |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.95 <i>US</i> |           | 0.32  | 0.95 |
| N-Nitrosodi-n-propylamine | <0.48           |           | 0.13  | 0.48 |
| Pentachlorophenol         | <9.5            |           | 5.3   | 9.5  |
| Phenanthrene              | <0.95 <i>US</i> |           | 0.33  | 0.95 |
| Phenol                    | <4.8            |           | 0.34  | 4.8  |
| Pyrene                    | <0.95           |           | 0.46  | 0.95 |
| 1,2,4-Trichlorobenzene    | <1.9            |           | 0.29  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.5            |           | 2.2   | 9.5  |
| 2,4,6-Trichlorophenol     | <4.8 <i>US</i>  |           | 1.0   | 4.8  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 37   |           | 20 - 110          |
| Phenol-d5            | 25   |           | 10 - 115          |
| Nitrobenzene-d5      | 70   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 70   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 79   |           | 40 - 125          |
| Terphenyl-d14        | 92   |           | 50 - 135          |

*02/10/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-44539-2

Date Sampled: 02/29/2012 1120

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8270C SVOC

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8270C           | Analysis Batch: | 500-143421 | Instrument ID:         | CMS23     |
| Prep Method:     | 3510C           | Prep Batch:     | 500-142158 | Lab File ID:           | 44539-2.d |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 1070 mL   |
| Analysis Date:   | 03/16/2012 1742 |                 |            | Final Weight/Volume:   | 1.0 mL    |
| Prep Date:       | 03/02/2012 0915 |                 |            | Injection Volume:      | 1 uL      |

| Analyte                      | Result (ug/L)   | Qualifier | MDL   | RL   |
|------------------------------|-----------------|-----------|-------|------|
| Acenaphthene                 | <0.93 <i>JS</i> |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3            |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93           |           | 0.30  | 0.93 |
| Anthracene                   | <0.93 <i>JS</i> |           | 0.30  | 0.93 |
| Benzdine                     | <37             |           | 19    | 37   |
| Benzoic acid                 | <19 <i>JS</i>   |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19 <i>JS</i> |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19           |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23 <i>JS</i> |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93           |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19           |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19             |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9            |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9            |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9            |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3 <i>JS</i>  |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7            |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9            |           | 0.25  | 1.9  |
| Carbazole                    | <4.7 <i>JS</i>  |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3            |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3            |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9 <i>JS</i>  |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7            |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7 <i>JS</i>  |           | 0.76  | 4.7  |
| Chrysene                     | <0.47           |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28           |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9            |           | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7            |           | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9            |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9            |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9            |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7            |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3            |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9            |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3 <i>JS</i>  |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9            |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19             |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19 <i>JS</i>   |           | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3            |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47           |           | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3            |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93           |           | 0.30  | 0.93 |
| Fluorene                     | <0.93 <i>JS</i> |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7            |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47 <i>JS</i> |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7            |           | 1.0   | 4.7  |

*cey/d/r*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-44539-2

Date Sampled: 02/29/2012 1120

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8270C SVOC

|                                |                            |                                |
|--------------------------------|----------------------------|--------------------------------|
| Analysis Method: 8270C         | Analysis Batch: 500-143421 | Instrument ID: CMS23           |
| Prep Method: 3510C             | Prep Batch: 500-142158     | Lab File ID: 44539-2.d         |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 1070 mL |
| Analysis Date: 03/16/2012 1742 |                            | Final Weight/Volume: 1.0 mL    |
| Prep Date: 03/02/2012 0915     |                            | Injection Volume: 1 uL         |

| Analyte                   | Result (ug/L)   | Qualifier | MDL   | RL   |
|---------------------------|-----------------|-----------|-------|------|
| Hexachloroethane          | <4.7            |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23           |           | 0.079 | 0.23 |
| Isophorone                | <1.9            |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47 <i>CK</i> |           | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9            |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9 <i>CK</i>  |           | 0.41  | 1.9  |
| Naphthalene               | <0.93           |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7            |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3            |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3            |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93           |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3            |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19 <i>CK</i>   |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93 <i>CK</i> |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47           |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3            |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93 <i>CK</i> |           | 0.33  | 0.93 |
| Phenol                    | <4.7            |           | 0.34  | 4.7  |
| Pyrene                    | <0.93           |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9            |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3            |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7 <i>CK</i>  |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 33   |           | 20 - 110          |
| Phenol-d5            | 22   |           | 10 - 115          |
| Nitrobenzene-d5      | 62   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 63   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 75   |           | 40 - 125          |
| Terphenyl-d14        | 85   |           | 50 - 135          |

024/10/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-44539-3

Date Sampled: 02/29/2012 1300

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8270C SVOC

Analysis Method: 8270C  
 Prep Method: 3510C  
 Dilution: 1.0  
 Analysis Date: 03/16/2012 1802  
 Prep Date: 03/02/2012 0915

Analysis Batch: 500-143421  
 Prep Batch: 500-142158

Instrument ID: CMS23  
 Lab File ID: 44539-3.d  
 Initial Weight/Volume: 1070 mL  
 Final Weight/Volume: 1.0 mL  
 Injection Volume: 1 uL

| Analyte                      | Result (ug/L)   | Qualifier | MDL   | RL   |
|------------------------------|-----------------|-----------|-------|------|
| Acenaphthene                 | <0.93 <i>JS</i> |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3            |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93           |           | 0.30  | 0.93 |
| Anthracene                   | <0.93 <i>JS</i> |           | 0.30  | 0.93 |
| Benzidine                    | <37             |           | 19    | 37   |
| Benzoic acid                 | <19 <i>JS</i>   |           | 4.3   | 19   |
| Benzo[a]anthracene           | 0.13 <i>JS</i>  | J         | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | 0.15            | J         | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | 0.17 <i>JS</i>  | J         | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93           |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | 0.16            | J         | 0.052 | 0.19 |
| Benzyl alcohol               | <19             |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9            |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9            |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9            |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3 <i>JS</i>  |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7 <i>JS</i>  |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9            |           | 0.25  | 1.9  |
| Carbazole                    | <4.7 <i>JS</i>  |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3            |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3            |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9 <i>JS</i>  |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7            |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7 <i>JS</i>  |           | 0.76  | 4.7  |
| Chrysene                     | 0.13            | J         | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | 0.18            | J         | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9            |           | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7            |           | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9            |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9            |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9            |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7            |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3            |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9            |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3 <i>JS</i>  |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9            |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19             |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19 <i>JS</i>   | A         | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3            |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47           |           | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3            |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93           |           | 0.30  | 0.93 |
| Fluorene                     | <0.93 <i>JS</i> |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7            |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47 <i>JS</i> |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7            |           | 1.0   | 4.7  |

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-44539-3

Date Sampled: 02/29/2012 1300

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8270C SVOC

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8270C           | Analysis Batch: | 500-143421 | Instrument ID:         | CMS23     |
| Prep Method:     | 3510C           | Prep Batch:     | 500-142158 | Lab File ID:           | 44539-3.d |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 1070 mL   |
| Analysis Date:   | 03/16/2012 1802 |                 |            | Final Weight/Volume:   | 1.0 mL    |
| Prep Date:       | 03/02/2012 0915 |                 |            | Injection Volume:      | 1 uL      |

| Analyte                   | Result (ug/L)  | Qualifier | MDL   | RL   |
|---------------------------|----------------|-----------|-------|------|
| Hexachloroethane          | <4.7           |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | 0.17           | J         | 0.079 | 0.23 |
| Isophorone                | <1.9           |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47 <i>ک</i> |           | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9           |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9 <i>ک</i>  |           | 0.41  | 1.9  |
| Naphthalene               | <0.93          |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7           |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3           |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3           |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93          |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3           |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19 <i>ک</i>   |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93 <i>ک</i> |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47          |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3           |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93 <i>ک</i> |           | 0.33  | 0.93 |
| Phenol                    | <4.7           |           | 0.34  | 4.7  |
| Pyrene                    | <0.93          |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9           |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3           |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7 <i>ک</i>  |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 32   |           | 20 - 110          |
| Phenol-d5            | 21   |           | 10 - 115          |
| Nitrobenzene-d5      | 59   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 59   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 75   |           | 40 - 125          |
| Terphenyl-d14        | 86   |           | 50 - 135          |

*02/10/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-44539-4

Date Sampled: 02/29/2012 1350

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8270C SVOC

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8270C           | Analysis Batch: | 500-143421 | Instrument ID:         | CMS23     |
| Prep Method:     | 3510C           | Prep Batch:     | 500-142158 | Lab File ID:           | 44539-4.d |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 1070 mL   |
| Analysis Date:   | 03/16/2012 1822 |                 |            | Final Weight/Volume:   | 1.0 mL    |
| Prep Date:       | 03/02/2012 0915 |                 |            | Injection Volume:      | 1 uL      |

| Analyte                      | Result (ug/L)   | Qualifier | MDL   | RL   |
|------------------------------|-----------------|-----------|-------|------|
| Acenaphthene                 | <0.93 <i>JS</i> |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3            |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93           |           | 0.30  | 0.93 |
| Anthracene                   | <0.93 <i>JS</i> |           | 0.30  | 0.93 |
| Benzidine                    | <37             |           | 19    | 37   |
| Benzoic acid                 | <19 <i>JS</i>   |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19 <i>JS</i> |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19           |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23 <i>JS</i> |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93           |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19           |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19             |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9            |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9            |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9            |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3 <i>JS</i>  |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7 <i>JS</i>  |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9 <i>JS</i>  |           | 0.25  | 1.9  |
| Carbazole                    | <4.7 <i>JS</i>  |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3            |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3            |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9 <i>JS</i>  |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7            |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7 <i>JS</i>  |           | 0.76  | 4.7  |
| Chrysene                     | <0.47           |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28           |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9            |           | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7            |           | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9            |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9            |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9            |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7            |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3            |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9 <i>JS</i>  |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3            |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9            |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19             |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19 <i>JS</i>   |           | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3            |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47           |           | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3            |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93           |           | 0.30  | 0.93 |
| Fluorene                     | <0.93 <i>JS</i> |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7            |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47 <i>JS</i> |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7            |           | 1.0   | 4.7  |

02/10/12 03/22/2012

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-44539-4

Date Sampled: 02/29/2012 1350

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8270C SVOC

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8270C           | Analysis Batch: | 500-143421 | Instrument ID:         | CMS23     |
| Prep Method:     | 3510C           | Prep Batch:     | 500-142158 | Lab File ID:           | 44539-4.d |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 1070 mL   |
| Analysis Date:   | 03/16/2012 1822 |                 |            | Final Weight/Volume:   | 1.0 mL    |
| Prep Date:       | 03/02/2012 0915 |                 |            | Injection Volume:      | 1 uL      |

| Analyte                   | Result (ug/L)   | Qualifier | MDL   | RL   |
|---------------------------|-----------------|-----------|-------|------|
| Hexachloroethane          | <4.7            |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23           |           | 0.079 | 0.23 |
| Isophorone                | <1.9            |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47 <i>OK</i> |           | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9            |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9 <i>OK</i>  |           | 0.41  | 1.9  |
| Naphthalene               | <0.93           |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7            |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3            |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3            |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93           |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3            |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19 <i>OK</i>   |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93 <i>OK</i> |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47           |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3            |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93 <i>OK</i> |           | 0.33  | 0.93 |
| Phenol                    | <4.7            |           | 0.34  | 4.7  |
| Pyrene                    | <0.93           |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9            |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3            |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7 <i>OK</i>  |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 34   |           | 20 - 110          |
| Phenol-d5            | 23   |           | 10 - 115          |
| Nitrobenzene-d5      | 64   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 67   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 79   |           | 40 - 125          |
| Terphenyl-d14        | 87   |           | 50 - 135          |

*CEW/10/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-44539-5

Date Sampled: 02/29/2012 1700

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8270C SVOC

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8270C           | Analysis Batch: | 500-143421 | Instrument ID:         | CMS23     |
| Prep Method:     | 3510C           | Prep Batch:     | 500-142158 | Lab File ID:           | 44539-5.d |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 1070 mL   |
| Analysis Date:   | 03/16/2012 1842 |                 |            | Final Weight/Volume:   | 1.0 mL    |
| Prep Date:       | 03/02/2012 0915 |                 |            | Injection Volume:      | 1 uL      |

| Analyte                      | Result (ug/L)   | Qualifier | MDL   | RL   |
|------------------------------|-----------------|-----------|-------|------|
| Acenaphthene                 | <0.93 <i>JS</i> |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3            |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93           |           | 0.30  | 0.93 |
| Anthracene                   | <0.93 <i>JS</i> |           | 0.30  | 0.93 |
| Benzidine                    | <37             |           | 19    | 37   |
| Benzoic acid                 | <19 <i>JS</i>   |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19 <i>JS</i> |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19           |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23 <i>JS</i> |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93           |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19           |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19             |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9            |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9            |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9            |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3 <i>JS</i>  |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7 <i>JS</i>  |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9            |           | 0.25  | 1.9  |
| Carbazole                    | <4.7 <i>JS</i>  |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3            |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3            |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9 <i>JS</i>  |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7            |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7 <i>JS</i>  |           | 0.76  | 4.7  |
| Chrysene                     | <0.47           |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28           |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9            |           | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7            |           | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9            |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9            |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9            |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7            |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3            |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9            |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3 <i>JS</i>  |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9            |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19             |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19 <i>JS</i>   |           | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3            |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47           |           | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3            |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93           |           | 0.30  | 0.93 |
| Fluorene                     | <0.93 <i>JS</i> |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7            |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47 <i>JS</i> |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7            |           | 1.0   | 4.7  |

*02/10/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-44539-5

Date Sampled: 02/29/2012 1700

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8270C SVOC

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8270C           | Analysis Batch: | 500-143421 | Instrument ID:         | CMS23     |
| Prep Method:     | 3510C           | Prep Batch:     | 500-142158 | Lab File ID:           | 44539-5.d |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 1070 mL   |
| Analysis Date:   | 03/16/2012 1842 |                 |            | Final Weight/Volume:   | 1.0 mL    |
| Prep Date:       | 03/02/2012 0915 |                 |            | Injection Volume:      | 1 uL      |

| Analyte                   | Result (ug/L)   | Qualifier | MDL   | RL   |
|---------------------------|-----------------|-----------|-------|------|
| Hexachloroethane          | <4.7            |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23           |           | 0.079 | 0.23 |
| Isophorone                | <1.9            |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47 <i>KS</i> |           | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9            |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9 <i>KS</i>  |           | 0.41  | 1.9  |
| Naphthalene               | <0.93           |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7            |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3            |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3            |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93           |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3            |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19 <i>KS</i>   |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93 <i>KS</i> |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47           |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3            |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93 <i>KS</i> |           | 0.33  | 0.93 |
| Phenol                    | <4.7            |           | 0.34  | 4.7  |
| Pyrene                    | <0.93           |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9            |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3            |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7 <i>KS</i>  |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 31   |           | 20 - 110          |
| Phenol-d5            | 20   |           | 10 - 115          |
| Nitrobenzene-d5      | 62   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 64   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 64   |           | 40 - 125          |
| Terphenyl-d14        | 90   |           | 50 - 135          |

*029/10/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-44539-6

Date Sampled: 02/29/2012 1200

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8270C SVOC

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8270C           | Analysis Batch: | 500-143421 | Instrument ID:         | CMS23     |
| Prep Method:     | 3510C           | Prep Batch:     | 500-142158 | Lab File ID:           | 44539-6.d |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 1070 mL   |
| Analysis Date:   | 03/16/2012 2002 |                 |            | Final Weight/Volume:   | 1.0 mL    |
| Prep Date:       | 03/02/2012 0915 |                 |            | Injection Volume:      | 1 uL      |

| Analyte                      | Result (ug/L)   | Qualifier | MDL   | RL   |
|------------------------------|-----------------|-----------|-------|------|
| Acenaphthene                 | <0.93 <i>JS</i> |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3            |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93           |           | 0.30  | 0.93 |
| Anthracene                   | <0.93 <i>JS</i> |           | 0.30  | 0.93 |
| Benzidine                    | <37             |           | 19    | 37   |
| Benzoic acid                 | <19 <i>JS</i>   |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19 <i>JS</i> |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19           |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23 <i>JS</i> |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93           |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19           |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19             |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9            |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9            |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9            |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3 <i>JS</i>  |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7 <i>JS</i>  |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9 <i>JS</i>  |           | 0.25  | 1.9  |
| Carbazole                    | <4.7 <i>JS</i>  |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3            |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3            |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9 <i>JS</i>  |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7            |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7 <i>JS</i>  |           | 0.76  | 4.7  |
| Chrysene                     | <0.47           |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28           |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9            |           | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7            |           | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9            |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9            |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9            |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7            |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3            |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9            |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3 <i>JS</i>  |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9            |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19             |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19 <i>JS</i>   |           | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3            |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47           |           | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3            |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93           |           | 0.30  | 0.93 |
| Fluorene                     | <0.93 <i>JS</i> |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7            |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47 <i>JS</i> |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7            |           | 1.0   | 4.7  |

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-44539-6

Date Sampled: 02/29/2012 1200

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8270C SVOC

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8270C           | Analysis Batch: | 500-143421 | Instrument ID:         | CMS23     |
| Prep Method:     | 3510C           | Prep Batch:     | 500-142158 | Lab File ID:           | 44539-6.d |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 1070 mL   |
| Analysis Date:   | 03/16/2012 2002 |                 |            | Final Weight/Volume:   | 1.0 mL    |
| Prep Date:       | 03/02/2012 0915 |                 |            | Injection Volume:      | 1 uL      |

| Analyte                   | Result (ug/L)   | Qualifier | MDL   | RL   |
|---------------------------|-----------------|-----------|-------|------|
| Hexachloroethane          | <4.7            |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23           |           | 0.079 | 0.23 |
| Isophorone                | <1.9            |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47 <i>us</i> |           | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9            |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9 <i>us</i>  |           | 0.41  | 1.9  |
| Naphthalene               | <0.93           |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7            |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3            |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3            |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93           |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3            |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19 <i>us</i>   |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93 <i>us</i> |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47           |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3            |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93 <i>us</i> |           | 0.33  | 0.93 |
| Phenol                    | <4.7            |           | 0.34  | 4.7  |
| Pyrene                    | <0.93           |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9            |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3            |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7 <i>us</i>  |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 34   |           | 20 - 110          |
| Phenol-d5            | 23   |           | 10 - 115          |
| Nitrobenzene-d5      | 62   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 64   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 69   |           | 40 - 125          |
| Terphenyl-d14        | 90   |           | 50 - 135          |

*cew/10/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-44539-7

Date Sampled: 02/29/2012 1510

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8270C SVOC

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8270C           | Analysis Batch: | 500-143421 | Instrument ID:         | CMS23     |
| Prep Method:     | 3510C           | Prep Batch:     | 500-142158 | Lab File ID:           | 44539-7.d |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 1070 mL   |
| Analysis Date:   | 03/16/2012 2022 |                 |            | Final Weight/Volume:   | 1.0 mL    |
| Prep Date:       | 03/02/2012 0915 |                 |            | Injection Volume:      | 1 uL      |

| Analyte                      | Result (ug/L)   | Qualifier | MDL   | RL   |
|------------------------------|-----------------|-----------|-------|------|
| Acenaphthene                 | <0.93 <i>JS</i> |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3            |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93           |           | 0.30  | 0.93 |
| Anthracene                   | <0.93 <i>JS</i> |           | 0.30  | 0.93 |
| Benzidine                    | <37             |           | 19    | 37   |
| Benzoic acid                 | <19 <i>JS</i>   |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19 <i>JS</i> |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19           |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23 <i>JS</i> |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93           |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19           |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19             |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9            |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9            |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9            |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3 <i>JS</i>  |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7 <i>JS</i>  |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9 <i>JS</i>  |           | 0.25  | 1.9  |
| Carbazole                    | <4.7 <i>JS</i>  |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3            |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3            |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9 <i>JS</i>  |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7            |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7 <i>JS</i>  |           | 0.76  | 4.7  |
| Chrysene                     | <0.47           |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28           |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9            |           | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7            |           | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9            |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9            |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9            |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7            |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3            |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9            |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3 <i>JS</i>  |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9            |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19             |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19 <i>JS</i>   | A         | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3            |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47           |           | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3            |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93           |           | 0.30  | 0.93 |
| Fluorene                     | <0.93 <i>JS</i> |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7            |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47 <i>JS</i> |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7            |           | 1.0   | 4.7  |

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-44539-7

Date Sampled: 02/29/2012 1510

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8270C SVOC

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8270C           | Analysis Batch: | 500-143421 | Instrument ID:         | CMS23     |
| Prep Method:     | 3510C           | Prep Batch:     | 500-142158 | Lab File ID:           | 44539-7.d |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 1070 mL   |
| Analysis Date:   | 03/16/2012 2022 |                 |            | Final Weight/Volume:   | 1.0 mL    |
| Prep Date:       | 03/02/2012 0915 |                 |            | Injection Volume:      | 1 uL      |

| Analyte                   | Result (ug/L)   | Qualifier | MDL   | RL   |
|---------------------------|-----------------|-----------|-------|------|
| Hexachloroethane          | <4.7            |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23           |           | 0.079 | 0.23 |
| Isophorone                | <1.9            |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47 <i>OK</i> |           | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9            |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9 <i>OK</i>  |           | 0.41  | 1.9  |
| Naphthalene               | <0.93           |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7            |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3            |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3            |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93           |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3            |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19 <i>OK</i>   |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93 <i>OK</i> |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47           |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3            |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93 <i>OK</i> |           | 0.33  | 0.93 |
| Phenol                    | <4.7            |           | 0.34  | 4.7  |
| Pyrene                    | <0.93           |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9            |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3            |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7 <i>OK</i>  |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 41   |           | 20 - 110          |
| Phenol-d5            | 29   |           | 10 - 115          |
| Nitrobenzene-d5      | 74   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 82   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 93   |           | 40 - 125          |
| Terphenyl-d14        | 80   |           | 50 - 135          |

*02/16/12*  
03/22/2012

LDC #: 27391A2

## VALIDATION COMPLETENESS WORKSHEET

Date: 4/4/12

SDG #: 500-44539-1

Level III

Page: 1 of 1

Laboratory: Test America, Inc.

Reviewer: BA

2nd Reviewer: W

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                                |    | Comments                 |
|-------|--|----|--------------------------|
| I.    | Technical holding times                        | A  | Sampling dates: 02/29/12 |
| II.   | GC/MS instrument performance check             | A  |                          |
| III.  | Initial calibration                            | SW | $RSD \leq 30/152, r^2$   |
| IV.   | Continuing calibration/ICV                     | SW | $ICV/CCV \leq 202$       |
| V.    | Blanks   | A  |                          |
| VI.   | Surrogate spikes                               | A  |                          |
| VII.  | Matrix spike/Matrix spike duplicates           | SW |                          |
| VIII. | Laboratory control samples                     | A  | LCS                      |
| IX.   | Regional Quality Assurance and Quality Control | N  |                          |
| X.    | Internal standards                             | A  |                          |
| XI.   | Target compound identification                 | N  |                          |
| XII.  | Compound quantitation/RL/LOQ/LODs              | N  |                          |
| XIII. | Tentatively identified compounds (TICs)        | N  |                          |
| XIV.  | System performance                             | N  |                          |
| XV.   | Overall assessment of data                     | A  |                          |
| XVI.  | Field duplicates                               | ND | FD = 576                 |
| XVII. | Field blanks                                   | N  |                          |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples: Water

|    |                   |    |               |    |  |    |  |
|----|-------------------|----|---------------|----|--|----|--|
| 1  | JP-M13-GWMW126R   | 11 | 500-142158-MB | 21 |  | 31 |  |
| 2  | JP-M13-GWMW362    | 12 |               | 22 |  | 32 |  |
| 3  | JP-M13-GWMW806    | 13 |               | 23 |  | 33 |  |
| 4  | JP-M13-GWMW807    | 14 |               | 24 |  | 34 |  |
| 5  | JP-M13-GWMW809    | 15 |               | 25 |  | 35 |  |
| 6  | JP-M13-GWMW999    | 16 |               | 26 |  | 36 |  |
| 7  | JP-M13-GWMW808    | 17 |               | 27 |  | 37 |  |
| 8  | JP-M13-GWMW808MS  | 18 |               | 28 |  | 38 |  |
| 9  | JP-M13-GWMW808MSD | 19 |               | 29 |  | 39 |  |
| 10 |                   | 20 |               | 30 |  | 40 |  |

# VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

|                                      |                               |                                  |                                 |                                  |
|--------------------------------------|-------------------------------|----------------------------------|---------------------------------|----------------------------------|
| A. Phenol**                          | P. Bis(2-chloroethoxy)methane | EE. 2,6-Dinitrotoluene           | TT. Pentachlorophenol**         | III. Benzo(a)pyrene**            |
| B. Bis(2-chloroethyl) ether          | Q. 2,4-Dichlorophenol**       | FF. 3-Nitroaniline               | UU. Phenanthrene                | JJJ. Indeno(1,2,3-cd)pyrene      |
| C. 2-Chlorophenol                    | R. 1,2,4-Trichlorobenzene     | GG. Acenaphthene**               | VV. Anthracene                  | KKK. Dibenz(a,h)anthracene       |
| D. 1,3-Dichlorobenzene               | S. Naphthalene                | HH. 2,4-Dinitrophenol*           | WW. Carbazole                   | LLL. Benzo(g,h,i)perylene        |
| E. 1,4-Dichlorobenzene**             | T. 4-Chloroaniline            | II. 4-Nitrophenol*               | XX. Di-n-butylphthalate         | MMM. Bis(2-Chloroisopropyl)ether |
| F. 1,2-Dichlorobenzene               | U. Hexachlorobutadiene**      | JJ. Dibenzofuran                 | YY. Fluoranthene**              | NNN. Aniline                     |
| G. 2-Methylphenol                    | V. 4-Chloro-3-methylphenol**  | KK. 2,4-Dinitrotoluene           | ZZ. Pyrene                      | OOO. N-Nitrosodimethylamine      |
| H. 2,2'-Oxybis(1-chloropropane)      | W. 2-Methylnaphthalene        | LL. Diethylphthalate             | AAA. Butylbenzylphthalate       | PPP. Benzoic Acid                |
| I. 4-Methylphenol 3 3 4 Methylphenol | X. Hexachlorocyclopentadiene* | MM. 4-Chlorophenyl-phenyl ether  | BBB. 3,3'-Dichlorobenzidine     | QQQ. Benzyl alcohol              |
| J. N-Nitroso-di-n-propylamine*       | Y. 2,4,6-Trichlorophenol**    | NN. Fluorene                     | CCC. Benzo(a)anthracene         | RRR. Pyridine                    |
| K. Hexachloroethane                  | Z. 2,4,5-Trichlorophenol      | OO. 4-Nitroaniline               | DDD. Chrysene                   | SSS. Benzidine                   |
| L. Nitrobenzene                      | AA. 2-Chloronaphthalene       | PP. 4,6-Dinitro-2-methylphenol   | EEE. Bis(2-ethylhexyl)phthalate | TTT.                             |
| M. Isophorane                        | BB. 2-Nitroaniline            | QQ. N-Nitrosodiphenylamine (1)** | FFF. Di-n-octylphthalate**      | UUU                              |
| N. 2-Nitrophenol**                   | CC. Dimethylphthalate         | RR. 4-Bromophenyl-phenylether    | GGG. Benzo(b)fluoranthene       | VVV.                             |
| O. 2,4-Dimethylphenol                | DD. Acenaphthylene            | SS. Hexachlorobenzene            | HHH. Benzo(k)fluoranthene       | WWW.                             |

Notes:\*\* = System performance check compound (SPCC) for RRF; \*\* = Calibration check compound (CCC) for %RSD.

|     |   |     |
|-----|---|-----|
| 1   | N | N/A |
| 2   | N | N/A |
| 3   | N | N/A |
| 4   | N | N/A |
| 5   | N | N/A |
| 6   | N | N/A |
| 7   | N | N/A |
| 8   | N | N/A |
| 9   | N | N/A |
| 10  | N | N/A |
| 11  | N | N/A |
| 12  | N | N/A |
| 13  | N | N/A |
| 14  | N | N/A |
| 15  | N | N/A |
| 16  | N | N/A |
| 17  | N | N/A |
| 18  | N | N/A |
| 19  | N | N/A |
| 20  | N | N/A |
| 21  | N | N/A |
| 22  | N | N/A |
| 23  | N | N/A |
| 24  | N | N/A |
| 25  | N | N/A |
| 26  | N | N/A |
| 27  | N | N/A |
| 28  | N | N/A |
| 29  | N | N/A |
| 30  | N | N/A |
| 31  | N | N/A |
| 32  | N | N/A |
| 33  | N | N/A |
| 34  | N | N/A |
| 35  | N | N/A |
| 36  | N | N/A |
| 37  | N | N/A |
| 38  | N | N/A |
| 39  | N | N/A |
| 40  | N | N/A |
| 41  | N | N/A |
| 42  | N | N/A |
| 43  | N | N/A |
| 44  | N | N/A |
| 45  | N | N/A |
| 46  | N | N/A |
| 47  | N | N/A |
| 48  | N | N/A |
| 49  | N | N/A |
| 50  | N | N/A |
| 51  | N | N/A |
| 52  | N | N/A |
| 53  | N | N/A |
| 54  | N | N/A |
| 55  | N | N/A |
| 56  | N | N/A |
| 57  | N | N/A |
| 58  | N | N/A |
| 59  | N | N/A |
| 60  | N | N/A |
| 61  | N | N/A |
| 62  | N | N/A |
| 63  | N | N/A |
| 64  | N | N/A |
| 65  | N | N/A |
| 66  | N | N/A |
| 67  | N | N/A |
| 68  | N | N/A |
| 69  | N | N/A |
| 70  | N | N/A |
| 71  | N | N/A |
| 72  | N | N/A |
| 73  | N | N/A |
| 74  | N | N/A |
| 75  | N | N/A |
| 76  | N | N/A |
| 77  | N | N/A |
| 78  | N | N/A |
| 79  | N | N/A |
| 80  | N | N/A |
| 81  | N | N/A |
| 82  | N | N/A |
| 83  | N | N/A |
| 84  | N | N/A |
| 85  | N | N/A |
| 86  | N | N/A |
| 87  | N | N/A |
| 88  | N | N/A |
| 89  | N | N/A |
| 90  | N | N/A |
| 91  | N | N/A |
| 92  | N | N/A |
| 93  | N | N/A |
| 94  | N | N/A |
| 95  | N | N/A |
| 96  | N | N/A |
| 97  | N | N/A |
| 98  | N | N/A |
| 99  | N | N/A |
| 100 | N | N/A |

[illegible]

[illegible]



**Laboratory Data Consultants, Inc.  
Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** February 29, 2012  
**LDC Report Date:** April 5, 2012  
**Matrix:** Water  
**Parameters:** Dissolved Metals  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-44539-1

**Sample Identification**

JP-M13-GWMW126R  
JP-M13-GWMW362  
JP-M13-GWMW806  
JP-M13-GWMW807  
JP-M13-GWMW809  
JP-M13-GWMW999  
JP-M13-GWMW808  
JP-M13-GWMW808MS  
JP-M13-GWMW808MSD  
JP-M13-GWMW808DUP

## Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B and 7470A for Dissolved Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. ICPMS Tune

ICP-MS was not utilized in this SDG.

## III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No dissolved metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

| Method Blank ID | Analyte                    | Maximum Concentration                         | Associated Samples             |
|-----------------|----------------------------|---|--------------------------------|
| PB (prep blank) | Antimony<br>Barium<br>Lead | 0.00357 mg/L<br>0.000520 mg/L<br>0.00175 mg/L | All samples in SDG 500-44539-1 |

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

| Sample          | Analyte          | Reported Concentration     | Modified Final Concentration |
|-----------------|------------------|----------------------------|------------------------------|
| JP-M13-GWMW126R | Lead             | 0.0016 mg/L                | 0.0016U mg/L                 |
| JP-M13-GWMW362  | Antimony<br>Lead | 0.0035 mg/L<br>0.0016 mg/L | 0.0035U mg/L<br>0.0016U mg/L |
| JP-M13-GWMW807  | Antimony<br>Lead | 0.0030 mg/L<br>0.0017 mg/L | 0.0030U mg/L<br>0.0017U mg/L |
| JP-M13-GWMW809  | Antimony         | 0.0028 mg/L                | 0.0028U mg/L                 |

| Sample         | Analyte          | Reported Concentration     | Modified Final Concentration |
|----------------|------------------|----------------------------|------------------------------|
| JP-M13-GWMW999 | Antimony<br>Lead | 0.0031 mg/L<br>0.0016 mg/L | 0.0031U mg/L<br>0.0016U mg/L |
| JP-M13-GWMW808 | Antimony         | 0.0033 mg/L                | 0.0033U mg/L                 |

No field blanks were identified in this SDG.

#### **V. ICP Interference Check Sample (ICS) Analysis**

The frequency of analysis was met.

The criteria for analysis were met.

#### **VI. Matrix Spike/(Matrix Spike) Duplicates**

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

#### **VII. Duplicate Sample Analysis**

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

#### **VIII. Laboratory Control Samples (LCS)**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

#### **IX. Internal Standards (ICP-MS)**

ICP-MS was not utilized in this SDG.

#### **X. Furnace Atomic Absorption QC**

Graphite furnace atomic absorption was not utilized in this SDG.

#### **XI. ICP Serial Dilution**

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

| Diluted Sample | Analyte   | %D (Limits)      | Associated Samples             | Flag                                    | A or P |
|----------------|-----------|------------------|--------------------------------|---|--------|
| JP-M13-GWMW808 | Potassium | 12 ( $\leq 10$ ) | All samples in SDG 500-44539-1 | J (all detects)<br>UJ (all non-detects) | A      |

## XII. Sample Result Verification

Raw data were not reviewed for this SDG.

## XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIV. Field Duplicates

Samples JP-M13-GWMW809 and JP-M13-GWMW999 were identified as field duplicates. No dissolved metals were detected in any of the samples with the following exceptions:

| Analyte   | Concentration (mg/L) |                | RPD (Limits)    | Difference (Limits)      | Flags | A or P |
|-----------|----------------------|----------------|-----------------|--------------------------|-------|--------|
|           | JP-M13-GWMW809       | JP-M13-GWMW999 |                 |                          |       |        |
| Antimony  | 0.0028               | 0.0031         | -               | 0.0003 ( $\leq 0.040$ )  | -     | -      |
| Barium    | 0.031                | 0.031          | -               | 0 ( $\leq 0.020$ )       | -     | -      |
| Calcium   | 41                   | 40             | 2 ( $\leq 25$ ) | -                        | -     | -      |
| Lead      | 0.0050U              | 0.0016         | -               | 0.0034 ( $\leq 0.0100$ ) | -     | -      |
| Magnesium | 31                   | 31             | 0 ( $\leq 25$ ) | -                        | -     | -      |
| Manganese | 0.0055               | 0.0059         | 7 ( $\leq 25$ ) | -                        | -     | -      |
| Potassium | 2.6                  | 2.6            | 0 ( $\leq 25$ ) | -                        | -     | -      |
| Sodium    | 19                   | 19             | 0 ( $\leq 25$ ) | -                        | -     | -      |
| Vanadium  | 0.0022               | 0.0024         | -               | 0.0002 ( $\leq 0.0100$ ) | -     | -      |

**JOAAP-GW****Dissolved Metals - Data Qualification Summary - SDG 500-44539-1**

| SDG         | Sample  | Analyte   | Flag                                    | A or P | Reason                   |
|-------------|---|-----------|---|--------|--------------------------|
| 500-44539-1 | JP-M13-GWMW126R<br>JP-M13-GWMW362<br>JP-M13-GWMW806<br>JP-M13-GWMW807<br>JP-M13-GWMW809<br>JP-M13-GWMW999<br>JP-M13-GWMW808 | Potassium | J (all detects)<br>UJ (all non-detects) | A      | ICP serial dilution (%D) |

**JOAAP-GW****Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 500-44539-1**

| SDG         | Sample          | Analyte          | Modified Final Concentration | A or P |
|-------------|-----------------|------------------|------------------------------|--------|
| 500-44539-1 | JP-M13-GWMW126R | Lead             | 0.0016U mg/L                 | A      |
| 500-44539-1 | JP-M13-GWMW362  | Antimony<br>Lead | 0.0035U mg/L<br>0.0016U mg/L | A      |
| 500-44539-1 | JP-M13-GWMW807  | Antimony<br>Lead | 0.0030U mg/L<br>0.0017U mg/L | A      |
| 500-44539-1 | JP-M13-GWMW809  | Antimony         | 0.0028U mg/L                 | A      |
| 500-44539-1 | JP-M13-GWMW999  | Antimony<br>Lead | 0.0031U mg/L<br>0.0016U mg/L | A      |
| 500-44539-1 | JP-M13-GWMW808  | Antimony         | 0.0033U mg/L                 | A      |

**JOAAP-GW****Dissolved Metals - Field Blank Data Qualification Summary - SDG 500-44539-1**

No Sample Data Qualified in this SDG

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-44539-1

Date Sampled: 02/29/2012 1000

Client Matrix: Water

Date Received: 03/01/2012 0947

## 6010B Metals (ICP)-Dissolved

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-142211 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-142106 | Lab File ID:           | P50302A |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 03/02/2012 1134 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 03/01/2012 1530 |                 |            |                        |         |

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | <0.20         |           | 0.025   | 0.20   |
| Antimony  | <0.020        |           | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.055         | B         | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | <0.0020       |           | 0.00054 | 0.0020 |
| Calcium   | 67            |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | <0.010        |           | 0.0011  | 0.010  |
| Iron      | <0.20         |           | 0.070   | 0.20   |
| Lead      | 0.0016 U      | J B       | 0.0016  | 0.0050 |
| Magnesium | 43            |           | 0.024   | 0.10   |
| Manganese | 0.0088        | J         | 0.0011  | 0.010  |
| Nickel    | <0.010        |           | 0.0019  | 0.010  |
| Potassium | 2.4 S         |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Sodium    | 26            |           | 0.12    | 1.0    |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | 0.0029        | J         | 0.00062 | 0.0050 |
| Zinc      | <0.020        |           | 0.0047  | 0.020  |

## 7470A Mercury (CVAA)-Dissolved

|                  |                 |                 |            |                        |             |
|------------------|-----------------|-----------------|------------|------------------------|-------------|
| Analysis Method: | 7470A           | Analysis Batch: | 500-142537 | Instrument ID:         | HG6         |
| Prep Method:     | 7470A           | Prep Batch:     | 500-142429 | Lab File ID:           | 030712R.CSV |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 25 mL       |
| Analysis Date:   | 03/07/2012 0847 |                 |            | Final Weight/Volume:   | 25 mL       |
| Prep Date:       | 03/06/2012 1415 |                 |            |                        |             |

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         |           | 0.070 | 0.20 |

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## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-44539-2

Date Sampled: 02/29/2012 1120

Client Matrix: Water

Date Received: 03/01/2012 0947

## 6010B Metals (ICP)-Dissolved

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-142211 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-142106 | Lab File ID:           | P50302A |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 03/02/2012 1156 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 03/01/2012 1530 |                 |            |                        |         |

| Analyte   | Result (mg/L)   | Qualifier | MDL     | RL     |
|-----------|-----------------|-----------|---------|--------|
| Aluminum  | <0.20           |           | 0.025   | 0.20   |
| Antimony  | 0.0035 <i>u</i> | J B       | 0.0026  | 0.020  |
| Arsenic   | <0.010          |           | 0.0024  | 0.010  |
| Barium    | 0.044           | B         | 0.00044 | 0.010  |
| Beryllium | <0.0040         |           | 0.00044 | 0.0040 |
| Cadmium   | <0.0020         |           | 0.00054 | 0.0020 |
| Calcium   | 160             |           | 0.087   | 0.20   |
| Chromium  | 0.0010          | J         | 0.00096 | 0.010  |
| Cobalt    | 0.0011          | J         | 0.0010  | 0.0050 |
| Copper    | <0.010          |           | 0.0011  | 0.010  |
| Iron      | <0.20           |           | 0.070   | 0.20   |
| Lead      | 0.0016 <i>u</i> | J B       | 0.0016  | 0.0050 |
| Magnesium | 100             |           | 0.024   | 0.10   |
| Manganese | 0.043           |           | 0.0011  | 0.010  |
| Nickel    | 0.0044          | J         | 0.0019  | 0.010  |
| Potassium | 8.5 <i>5</i>    |           | 0.070   | 0.50   |
| Selenium  | <0.010          |           | 0.0027  | 0.010  |
| Silver    | <0.0050         |           | 0.0011  | 0.0050 |
| Thallium  | <0.010          |           | 0.0013  | 0.010  |
| Vanadium  | 0.0047          | J         | 0.00062 | 0.0050 |
| Zinc      | <0.020          |           | 0.0047  | 0.020  |

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-142619 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-142106 | Lab File ID:           | P50307B |
| Dilution:        | 10              |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 03/07/2012 2039 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 03/01/2012 1530 |                 |            |                        |         |

| Analyte | Result (mg/L) | Qualifier | MDL | RL |
|---------|---------------|-----------|-----|----|
| Sodium  | 180           |           | 1.2 | 10 |

## 7470A Mercury (CVAA)-Dissolved

|                  |                 |                 |            |                        |             |
|------------------|-----------------|-----------------|------------|------------------------|-------------|
| Analysis Method: | 7470A           | Analysis Batch: | 500-142537 | Instrument ID:         | HG6         |
| Prep Method:     | 7470A           | Prep Batch:     | 500-142429 | Lab File ID:           | 030712R.CSV |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 25 mL       |
| Analysis Date:   | 03/07/2012 0849 |                 |            | Final Weight/Volume:   | 25 mL       |
| Prep Date:       | 03/06/2012 1415 |                 |            |                        |             |

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         |           | 0.070 | 0.20 |

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-44539-3

Date Sampled: 02/29/2012 1300

Client Matrix: Water

Date Received: 03/01/2012 0947

## 6010B Metals (ICP)-Dissolved

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-142211 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-142106 | Lab File ID:           | P50302A |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 03/02/2012 1202 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 03/01/2012 1530 |                 |            |                        |         |

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | <0.20         |           | 0.025   | 0.20   |
| Antimony  | <0.020        |           | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.096         | B         | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | <0.0020       |           | 0.00054 | 0.0020 |
| Calcium   | 76            |           | 0.087   | 0.20   |
| Chromium  | 0.00096       | J         | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | <0.010        |           | 0.0011  | 0.010  |
| Iron      | <0.20         |           | 0.070   | 0.20   |
| Lead      | <0.0050       |           | 0.0016  | 0.0050 |
| Magnesium | 46            |           | 0.024   | 0.10   |
| Manganese | 0.0017        | J         | 0.0011  | 0.010  |
| Nickel    | <0.010        |           | 0.0019  | 0.010  |
| Potassium | 2.1           |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Sodium    | 24            |           | 0.12    | 1.0    |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | 0.0031        | J         | 0.00062 | 0.0050 |
| Zinc      | <0.020        |           | 0.0047  | 0.020  |

## 7470A Mercury (CVAA)-Dissolved

|                  |                 |                 |            |                        |             |
|------------------|-----------------|-----------------|------------|------------------------|-------------|
| Analysis Method: | 7470A           | Analysis Batch: | 500-142537 | Instrument ID:         | HG6         |
| Prep Method:     | 7470A           | Prep Batch:     | 500-142429 | Lab File ID:           | 030712R.CSV |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 25 mL       |
| Analysis Date:   | 03/07/2012 0850 |                 |            | Final Weight/Volume:   | 25 mL       |
| Prep Date:       | 03/06/2012 1415 |                 |            |                        |             |

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         |           | 0.070 | 0.20 |

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## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-44539-4

Date Sampled: 02/29/2012 1350

Client Matrix: Water

Date Received: 03/01/2012 0947

## 6010B Metals (ICP)-Dissolved

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-142211 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-142106 | Lab File ID:           | P50302A |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 03/02/2012 1209 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 03/01/2012 1530 |                 |            |                        |         |

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | 0.026         | J         | 0.025   | 0.20   |
| Antimony  | 0.0030 U      | J B       | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.097         | B         | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | <0.0020       |           | 0.00054 | 0.0020 |
| Calcium   | 180           |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | <0.010        |           | 0.0011  | 0.010  |
| Iron      | 0.82          |           | 0.070   | 0.20   |
| Lead      | 0.0017 U      | J B       | 0.0016  | 0.0050 |
| Magnesium | 89            |           | 0.024   | 0.10   |
| Manganese | 0.092         |           | 0.0011  | 0.010  |
| Nickel    | 0.0021        | J         | 0.0019  | 0.010  |
| Potassium | 14 J          |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | 0.0040        | J         | 0.00062 | 0.0050 |
| Zinc      | <0.020        |           | 0.0047  | 0.020  |

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-142619 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-142106 | Lab File ID:           | P50307B |
| Dilution:        | 100             |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 03/07/2012 2045 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 03/01/2012 1530 |                 |            |                        |         |

| Analyte | Result (mg/L) | Qualifier | MDL | RL  |
|---------|---------------|-----------|-----|-----|
| Sodium  | 400           |           | 12  | 100 |

## 7470A Mercury (CVAA)-Dissolved

|                  |                 |                 |            |                        |             |
|------------------|-----------------|-----------------|------------|------------------------|-------------|
| Analysis Method: | 7470A           | Analysis Batch: | 500-142537 | Instrument ID:         | HG6         |
| Prep Method:     | 7470A           | Prep Batch:     | 500-142429 | Lab File ID:           | 030712R.CSV |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 25 mL       |
| Analysis Date:   | 03/07/2012 0852 |                 |            | Final Weight/Volume:   | 25 mL       |
| Prep Date:       | 03/06/2012 1415 |                 |            |                        |             |

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         |           | 0.070 | 0.20 |

03/21/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-44539-5

Date Sampled: 02/29/2012 1700

Client Matrix: Water

Date Received: 03/01/2012 0947

## 6010B Metals (ICP)-Dissolved

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-142211 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-142106 | Lab File ID:           | P50302A |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 03/02/2012 1215 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 03/01/2012 1530 |                 |            |                        |         |

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | <0.20         |           | 0.025   | 0.20   |
| Antimony  | 0.0028 U      | J B       | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.031         | B         | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | <0.0020       |           | 0.00054 | 0.0020 |
| Calcium   | 41            |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | <0.010        |           | 0.0011  | 0.010  |
| Iron      | <0.20         |           | 0.070   | 0.20   |
| Lead      | <0.0050       |           | 0.0016  | 0.0050 |
| Magnesium | 31            |           | 0.024   | 0.10   |
| Manganese | 0.0055        | J         | 0.0011  | 0.010  |
| Nickel    | <0.010        |           | 0.0019  | 0.010  |
| Potassium | 2.6 J         |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Sodium    | 19            |           | 0.12    | 1.0    |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | 0.0022        | J         | 0.00062 | 0.0050 |
| Zinc      | <0.020        |           | 0.0047  | 0.020  |

## 7470A Mercury (CVAA)-Dissolved

|                  |                 |                 |            |                        |             |
|------------------|-----------------|-----------------|------------|------------------------|-------------|
| Analysis Method: | 7470A           | Analysis Batch: | 500-142537 | Instrument ID:         | HG6         |
| Prep Method:     | 7470A           | Prep Batch:     | 500-142429 | Lab File ID:           | 030712R.CSV |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 25 mL       |
| Analysis Date:   | 03/07/2012 0854 |                 |            | Final Weight/Volume:   | 25 mL       |
| Prep Date:       | 03/06/2012 1415 |                 |            |                        |             |

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         |           | 0.070 | 0.20 |

CEY/10/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-44539-6

Date Sampled: 02/29/2012 1200

Client Matrix: Water

Date Received: 03/01/2012 0947

## 6010B Metals (ICP)-Dissolved

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-142211 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-142106 | Lab File ID:           | P50302A |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 03/02/2012 1221 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 03/01/2012 1530 |                 |            |                        |         |

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | <0.20         |           | 0.025   | 0.20   |
| Antimony  | 0.0031 U      | J B       | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.031         | B         | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | <0.0020       |           | 0.00054 | 0.0020 |
| Calcium   | 40            |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | <0.010        |           | 0.0011  | 0.010  |
| Iron      | <0.20         |           | 0.070   | 0.20   |
| Lead      | 0.0016 U      | J B       | 0.0016  | 0.0050 |
| Magnesium | 31            |           | 0.024   | 0.10   |
| Manganese | 0.0059        | J         | 0.0011  | 0.010  |
| Nickel    | <0.010        |           | 0.0019  | 0.010  |
| Potassium | 2.6 J         |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Sodium    | 19            |           | 0.12    | 1.0    |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | 0.0024        | J         | 0.00062 | 0.0050 |
| Zinc      | <0.020        |           | 0.0047  | 0.020  |

## 7470A Mercury (CVAA)-Dissolved

|                  |                 |                 |            |                        |             |
|------------------|-----------------|-----------------|------------|------------------------|-------------|
| Analysis Method: | 7470A           | Analysis Batch: | 500-142537 | Instrument ID:         | HG6         |
| Prep Method:     | 7470A           | Prep Batch:     | 500-142429 | Lab File ID:           | 030712R.CSV |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 25 mL       |
| Analysis Date:   | 03/07/2012 0855 |                 |            | Final Weight/Volume:   | 25 mL       |
| Prep Date:       | 03/06/2012 1415 |                 |            |                        |             |

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         |           | 0.070 | 0.20 |

C24/10/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-44539-7

Date Sampled: 02/29/2012 1510

Client Matrix: Water

Date Received: 03/01/2012 0947

## 6010B Metals (ICP)-Dissolved

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-142211 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-142106 | Lab File ID:           | P50302A |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 03/02/2012 1227 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 03/01/2012 1530 |                 |            |                        |         |

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | <0.20         |           | 0.025   | 0.20   |
| Antimony  | 0.0033 U      | J B       | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.16          | B         | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | <0.0020       |           | 0.00054 | 0.0020 |
| Calcium   | 120           |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | 0.0082        |           | 0.0010  | 0.0050 |
| Copper    | <0.010        |           | 0.0011  | 0.010  |
| Iron      | 1.7           |           | 0.070   | 0.20   |
| Lead      | <0.0050       |           | 0.0016  | 0.0050 |
| Magnesium | 67            |           | 0.024   | 0.10   |
| Manganese | 0.55          |           | 0.0011  | 0.010  |
| Nickel    | 0.022         |           | 0.0019  | 0.010  |
| Potassium | 11 S          | V         | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | 0.0040        | J         | 0.00062 | 0.0050 |
| Zinc      | 0.0066        | J         | 0.0047  | 0.020  |

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-142619 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-142106 | Lab File ID:           | P50307B |
| Dilution:        | 10              |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 03/07/2012 2051 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 03/01/2012 1530 |                 |            |                        |         |

| Analyte | Result (mg/L) | Qualifier | MDL | RL |
|---------|---------------|-----------|-----|----|
| Sodium  | 61            |           | 1.2 | 10 |

## 7470A Mercury (CVAA)-Dissolved

|                  |                 |                 |            |                        |             |
|------------------|-----------------|-----------------|------------|------------------------|-------------|
| Analysis Method: | 7470A           | Analysis Batch: | 500-142537 | Instrument ID:         | HG6         |
| Prep Method:     | 7470A           | Prep Batch:     | 500-142429 | Lab File ID:           | 030712R.CSV |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 25 mL       |
| Analysis Date:   | 03/07/2012 0857 |                 |            | Final Weight/Volume:   | 25 mL       |
| Prep Date:       | 03/06/2012 1415 |                 |            |                        |             |

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         |           | 0.070 | 0.20 |

024/10/12

LDC #: 27391A4

## VALIDATION COMPLETENESS WORKSHEET

Date: 4-5-12

SDG #: 500-44539-1

Level III

Page: 1 of 1

Laboratory: Test America, Inc.

9MAY

Reviewer: MG

2nd Reviewer: ✓

METHOD: Dissolved Metals (EPA SW 846 Method 6010B/7000) 7470A

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                              |    | Comments                |
|-------|--|----|-------------------------|
| I.    | Technical holding times                      | A  | Sampling dates: 2-29-12 |
| II.   | ICP/MS Tune                                  | N  | not utilized            |
| III.  | Calibration                                  | A  |                         |
| IV.   | Blanks                                       | SW |                         |
| V.    | ICP Interference Check Sample (ICS) Analysis | A  |                         |
| VI.   | Matrix Spike Analysis                        | A  | MS/MSD                  |
| VII.  | Duplicate Sample Analysis                    | A  | DUP                     |
| VIII. | Laboratory Control Samples (LCS)             | A  | LCS                     |
| IX.   | Internal Standard (ICP-MS)                   | N  | not utilized            |
| X.    | Furnace Atomic Absorption QC                 | N  | " "                     |
| XI.   | ICP Serial Dilution                          | SW |                         |
| XII.  | Sample Result Verification                   | N  |                         |
| XIII. | Overall Assessment of Data                   | A  |                         |
| XIV.  | Field Duplicates                             | SW | D = 5+6                 |
| XV.   | Field Blanks                                 | N  |                         |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:  
all water

|    |                   |    |     |    |  |    |  |
|----|-------------------|----|-----|----|--|----|--|
| 1  | JP-M13-GWMW126R   | 11 |     | 21 |  | 31 |  |
| 2  | JP-M13-GWMW362    | 12 |     | 22 |  | 32 |  |
| 3  | JP-M13-GWMW806    | 13 |     | 23 |  | 33 |  |
| 4  | JP-M13-GWMW807    | 14 |     | 24 |  | 34 |  |
| 5  | JP-M13-GWMW809    | 15 |     | 25 |  | 35 |  |
| 6  | JP-M13-GWMW999    | 16 |     | 26 |  | 36 |  |
| 7  | JP-M13-GWMW808    | 17 |     | 27 |  | 37 |  |
| 8  | JP-M13-GWMW808MS  | 18 |     | 28 |  | 38 |  |
| 9  | JP-M13-GWMW808MSD | 19 |     | 29 |  | 39 |  |
| 10 | JP-M13-GWMW808DUP | 20 | PBW | 30 |  | 40 |  |

Notes: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## VALIDATION FINDINGS WORKSHEET

### Sample Specific Element Reference

All circled elements are applicable to each sample.

[illegible]

Comments: Mercury by CVAA if performed

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

Sample Concentration units, unless otherwise noted: mg/L

Associated Samples: all

| Analyte | Maximum<br>PB*<br>(mg/Kg) | Maximum<br>PB*<br>(mg/L) | Maximum<br>ICB/CCB*<br>(ug/L) | Action<br>Limit | 1      | 2      | 4      | 5      | 6      | 7      |  |  |
|---------|---------------------------|--------------------------|-------------------------------|-----------------|--------|--------|--------|--------|--------|--------|--|--|
| Sb      |                           | 0.00357                  |                               | 0.01785         |        | 0.0035 | 0.0030 | 0.0028 | 0.0031 | 0.0033 |  |  |
| Ba      |                           | 0.000520                 |                               | 0.00260         |        |        |        |        |        |        |  |  |
| Pb      |                           | 0.00175                  |                               | 0.00875         | 0.0016 | 0.0016 | 0.0017 |        | 0.0016 |        |  |  |

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

## VALIDATION FINDINGS WORKSHEET

### ICP Serial Dilution

Page: 1 of 1  
Reviewer: MG  
2nd Reviewer: U

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

|   |   |     |
|---|---|-----|
| Y | N | N/A |
| Y | N | N/A |
| Y | N | N/A |

**LEVEL IV ONLY:**

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

[illegible]

Comments:

LDC#: 27391A4**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**Page: 1 of 1  
Reviewer: MG  
2nd Reviewer: V**METHOD:** Metals (EPA Method 6010B/6020/7000)Y N NA

Were field duplicate pairs identified in this SDG?

Y N NA

Were target analytes detected in the field duplicate pairs?

| Analyte   | Concentration (mg/L) |        | (≤25)<br>RPD | (mg/L)<br>Difference | (mg/L)<br>Limits | Qualifications<br>(Parent Only) |
|-----------|----------------------|--------|--------------|----------------------|------------------|---------------------------------|
|           | 5                    | 6      |              |                      |                  |                                 |
| Antimony  | 0.0028               | 0.0031 |              | 0.0003               | (≤0.040)         |                                 |
| Barium    | 0.031                | 0.031  |              | 0                    | (≤0.020)         |                                 |
| Calcium   | 41                   | 40     | 2            |                      |                  |                                 |
| Lead      | 0.0050U              | 0.0016 |              | 0.0034               | (≤0.0100)        |                                 |
| Magnesium | 31                   | 31     | 0            |                      |                  |                                 |
| Manganese | 0.0055               | 0.0059 | 7            |                      |                  |                                 |
| Potassium | 2.6                  | 2.6    | 0            |                      |                  |                                 |
| Sodium    | 19                   | 19     | 0            |                      |                  |                                 |
| Vanadium  | 0.0022               | 0.0024 |              | 0.0002               | (≤0.0100)        |                                 |

V:\FIELD DUPLICATES\FD\_inorganic\27391A4.wpd

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** JOAAP-GW  
**Collection Date:** February 29, 2012  
**LDC Report Date:** April 5, 2012  
**Matrix:** Water  
**Parameters:** Wet Chemistry  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-44539-1

### Sample Identification

JP-M13-GWMW126R  
JP-M13-GWMW362  
JP-M13-GWMW806  
JP-M13-GWMW807  
JP-M13-GWMW809  
JP-M13-GWMW999  
JP-M13-GWMW808  
JP-M13-GWMW808MS  
JP-M13-GWMW808MSD

## Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.0 for Dissolved Nitrate as Nitrogen and Dissolved Sulfate.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## **I. Technical Holding Times**

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## **II. Initial Calibration**

All criteria for the initial calibration were met.

## **III. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

| Method Blank ID | Analyte | Concentration | Associated Samples               |
|-----------------|---------|---------------|----------------------------------|
| ICB/CCB         | Sulfate | 0.0976 mg/L   | JP-M13-GWMW362<br>JP-M13-GWMW807 |

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks.

No field blanks were identified in this SDG.

## **V. Matrix Spike/Matrix Spike Duplicates**

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## **VI. Duplicates**

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

## **VII. Laboratory Control Samples**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

### IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### X. Field Duplicates

Samples JP-M13-GWMW809 and JP-M13-GWMW999 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

| Analyte | Concentration (mg/L) |                | RPD<br>(Limits) | Difference<br>(Limits) | Flags | A or P |
|---------|----------------------|----------------|-----------------|------------------------|-------|--------|
|         | JP-M13-GWMW809       | JP-M13-GWMW999 |                 |                        |       |        |
| Sulfate | 5.9                  | 5.9            | 0 (≤25)         | -                      | -     | -      |

**JOAAP-GW**

**Wet Chemistry - Data Qualification Summary - SDG 500-44539-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 500-44539-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Wet Chemistry - Field Blank Data Qualification Summary - SDG 500-44539-1**

No Sample Data Qualified in this SDG

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-44539-1

---

**General Chemistry**

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-44539-1

Client Matrix: Water

Date Sampled: 02/29/2012 1000

Date Received: 03/01/2012 0947

| Analyte                | Result                     | Qual                      | Units | MDL   | RL   | Dil | Method |
|------------------------|----------------------------|---------------------------|-------|-------|------|-----|--------|
| Nitrate as N-Dissolved | 0.12                       |                           | mg/L  | 0.023 | 0.10 | 1.0 | 300.0  |
|                        | Analysis Batch: 500-142165 | Analysis Date: 03/01/2012 | 1215  |       |      |     |        |
| Sulfate-Dissolved      | 53                         |                           | mg/L  | 0.90  | 2.0  | 10  | 300.0  |
|                        | Analysis Batch: 500-142165 | Analysis Date: 03/01/2012 | 1230  |       |      |     |        |

*CE 4/10/12*

03/22/2012

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-44539-1

---

**General Chemistry**

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-44539-2

Client Matrix: Water

Date Sampled: 02/29/2012 1120

Date Received: 03/01/2012 0947

| Analyte                | Result                     | Qual                           | Units | MDL  | RL  | Dil | Method |
|------------------------|----------------------------|--------------------------------|-------|------|-----|-----|--------|
| Nitrate as N-Dissolved | <1.0                       |                                | mg/L  | 0.23 | 1.0 | 10  | 300.0  |
|                        | Analysis Batch: 500-142165 | Analysis Date: 03/01/2012 1359 |       |      |     |     |        |
| Sulfate-Dissolved      | 280                        |                                | mg/L  | 4.5  | 10  | 50  | 300.0  |
|                        | Analysis Batch: 500-143315 | Analysis Date: 03/15/2012 0226 |       |      |     |     |        |

*CEY/10/12*

03/22/2012

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

## General Chemistry

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-44539-3

Client Matrix: Water

Date Sampled: 02/29/2012 1300

Date Received: 03/01/2012 0947

| Analyte                | Result                     | Qual                           | Units | MDL   | RL   | Dil | Method |
|------------------------|----------------------------|--------------------------------|-------|-------|------|-----|--------|
| Nitrate as N-Dissolved | 0.39                       |                                | mg/L  | 0.023 | 0.10 | 1.0 | 300.0  |
|                        | Analysis Batch: 500-142165 | Analysis Date: 03/01/2012 1414 |       |       |      |     |        |
| Sulfate-Dissolved      | 79                         |                                | mg/L  | 0.90  | 2.0  | 10  | 300.0  |
|                        | Analysis Batch: 500-142165 | Analysis Date: 03/01/2012 1429 |       |       |      |     |        |

02/10/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

## General Chemistry

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-44539-4

Client Matrix: Water

Date Sampled: 02/29/2012 1350

Date Received: 03/01/2012 0947

| Analyte                | Result                     | Qual                           | Units | MDL  | RL  | Dil | Method |
|------------------------|----------------------------|--------------------------------|-------|------|-----|-----|--------|
| Nitrate as N-Dissolved | <1.0                       |                                | mg/L  | 0.23 | 1.0 | 10  | 300.0  |
|                        | Analysis Batch: 500-142165 | Analysis Date: 03/01/2012 1459 |       |      |     |     |        |
| Sulfate-Dissolved      | 230                        |                                | mg/L  | 4.5  | 10  | 50  | 300.0  |
|                        | Analysis Batch: 500-143315 | Analysis Date: 03/15/2012 0241 |       |      |     |     |        |

024/10/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-44539-1

---

**General Chemistry**

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-44539-5

Client Matrix: Water

Date Sampled: 02/29/2012 1700

Date Received: 03/01/2012 0947

| Analyte                | Result                     | Qual                           | Units | MDL   | RL   | Dil | Method |
|------------------------|----------------------------|--------------------------------|-------|-------|------|-----|--------|
| Nitrate as N-Dissolved | <0.10                      |                                | mg/L  | 0.023 | 0.10 | 1.0 | 300.0  |
|                        | Analysis Batch: 500-142165 | Analysis Date: 03/01/2012 1514 |       |       |      |     |        |
| Sulfate-Dissolved      | 5.9                        |                                | mg/L  | 0.090 | 0.20 | 1.0 | 300.0  |
|                        | Analysis Batch: 500-142165 | Analysis Date: 03/01/2012 1514 |       |       |      |     |        |

024/10/12

03/22/2012

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

## General Chemistry

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-44539-6

Client Matrix: Water

Date Sampled: 02/29/2012 1200

Date Received: 03/01/2012 0947

| Analyte                | Result                     | Qual                           | Units | MDL   | RL   | Dil | Method |
|------------------------|----------------------------|--------------------------------|-------|-------|------|-----|--------|
| Nitrate as N-Dissolved | <0.10                      |                                | mg/L  | 0.023 | 0.10 | 1.0 | 300.0  |
|                        | Analysis Batch: 500-142165 | Analysis Date: 03/01/2012 1543 |       |       |      |     |        |
| Sulfate-Dissolved      | 5.9                        |                                | mg/L  | 0.090 | 0.20 | 1.0 | 300.0  |
|                        | Analysis Batch: 500-142165 | Analysis Date: 03/01/2012 1543 |       |       |      |     |        |

*cey/10/12*  
03/22/2012

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

## General Chemistry

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-44539-7

Client Matrix: Water

Date Sampled: 02/29/2012 1510

Date Received: 03/01/2012 0947

| Analyte                | Result                     | Qual                           | Units | MDL   | RL   | Dil | Method |
|------------------------|----------------------------|--------------------------------|-------|-------|------|-----|--------|
| Nitrate as N-Dissolved | <0.10                      |                                | mg/L  | 0.023 | 0.10 | 1.0 | 300.0  |
|                        | Analysis Batch: 500-142165 | Analysis Date: 03/01/2012 1643 |       |       |      |     |        |
| Sulfate-Dissolved      | 99                         |                                | mg/L  | 0.90  | 2.0  | 10  | 300.0  |
|                        | Analysis Batch: 500-142165 | Analysis Date: 03/01/2012 1657 |       |       |      |     |        |

*CEH/10/12*  
03/22/2012

LDC #: 27391A6  
 SDG #: 500-44539-1  
 Laboratory: Test America, Inc.

# **VALIDATION COMPLETENESS WORKSHEET** **Level III**

Date: 4-5-12  
 Page: 1 of 1  
 Reviewer: MG  
 2nd Reviewer: [Signature]

**METHOD:** Dissolved Nitrate-N, Dissolved Sulfate (EPA Method 300.0)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                      |    | Comments                       |
|-------|--------------------------------------|----|--------------------------------|
| I.    | Technical holding times              | A  | Sampling dates: <u>2-29-12</u> |
| II.   | Initial calibration                  | A  |                                |
| III.  | Calibration verification             | A  |                                |
| IV.   | Blanks                               | SW |                                |
| V.    | Matrix Spike/Matrix Spike Duplicates | A  | MS / MSD                       |
| VI.   | Duplicates                           | N  |                                |
| VII.  | Laboratory control samples           | A  | LCS                            |
| VIII. | Sample result verification           | N  |                                |
| IX.   | Overall assessment of data           | A  |                                |
| X.    | Field duplicates                     | SW | D = 5+6                        |
| XI.   | Field blanks                         | N  |                                |

Note: A = Acceptable  
 N = Not provided/applicable  
 SW = See worksheet

ND = No compounds detected  
 R = Rinsate  
 FB = Field blank

D = Duplicate  
 TB = Trip blank  
 EB = Equipment blank

Validated Samples:  
all water

|    |                   |    |      |    |  |    |  |
|----|-------------------|----|------|----|--|----|--|
| 1  | JP-M13-GWMW126R   | 11 |      | 21 |  | 31 |  |
| 2  | JP-M13-GWMW362    | 12 |      | 22 |  | 32 |  |
| 3  | JP-M13-GWMW806    | 13 |      | 23 |  | 33 |  |
| 4  | JP-M13-GWMW807    | 14 |      | 24 |  | 34 |  |
| 5  | JP-M13-GWMW809    | 15 |      | 25 |  | 35 |  |
| 6  | JP-M13-GWMW999    | 16 |      | 26 |  | 36 |  |
| 7  | JP-M13-GWMW808    | 17 |      | 27 |  | 37 |  |
| 8  | JP-M13-GWMW808MS  | 18 |      | 28 |  | 38 |  |
| 9  | JP-M13-GWMW808MSD | 19 | PBW1 | 29 |  | 39 |  |
| 10 |                   | 20 | PBW2 | 30 |  | 40 |  |

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## VALIDATION FINDINGS WORKSHEET

### Sample Specific Analysis Reference

All circled methods are applicable to each sample.

[illegible]

Comments: \_\_\_\_\_

VALIDATION FINDINGS WORKSHEET  
BlanksPage: 1 of 1  
Reviewer: MG  
2nd Reviewer: [Signature]

METHOD: Inorganics, Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

☒ N ☐ N/A Were blank analyses performed as required? If no, please see qualifications below.☒ N ☐ N/A Were any activities in the blanks greater than the minimum detectable activity? If yes, please see qualifications below.

Conc. units: mg/L

Associated Samples: 2,4 (50x dil, &gt;5x)

| Analyte | Blank ID | Blank ID       | Blank Action Limit |            |  |  |  |  |
|---------|----------|----------------|--------------------|------------|--|--|--|--|
|         | PB       | ICB/CCB (mg/L) |                    | No Qual's. |  |  |  |  |
| SO4     |          | 0.0976         | 24.40              |            |  |  |  |  |
|         |          |                |                    |            |  |  |  |  |

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:

All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC#: 27391A6**VALIDATION FINDINGS WORKSHEET**Page: 1 of 1Field DuplicatesReviewer: MG2nd Reviewer:   Inorganics, Method See Cover

| Analyte | Concentration (mg/L) |     | RPD ( $\leq 25$ ) | Difference | Limits | Qualification<br>(Parent only) |
|---------|----------------------|-----|-------------------|------------|--------|--------------------------------|
|         | 5                    | 6   |                   |            |        |                                |
| Sulfate | 5.9                  | 5.9 | 0                 |            |        |                                |

V:\FIELD DUPLICATES\FD\_inorganic\27391A6.wpd

**Laboratory Data Consultants, Inc.**  
**Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** February 29, 2012  
**LDC Report Date:** April 5, 2012  
**Matrix:** Water  
**Parameters:** Explosives  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-44539-1

**Sample Identification**

JP-M13-GWMW126R  
JP-M13-GWMW362  
JP-M13-GWMW806  
JP-M13-GWMW807  
JP-M13-GWMW809  
JP-M13-GWMW999  
JP-M13-GWMW808  
JP-M13-GWMW808MS  
JP-M13-GWMW808MSD

## Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330 for Explosives.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

Initial calibration of compounds was performed for the primary (quantitation) column and confirmation column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

## III. Continuing Calibration

Continuing calibration was performed at the required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No explosive contaminants were found in the method blanks.

No field blanks were identified in this SDG.

## V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| Spike ID<br>(Associated<br>Samples)      | Compound              | MS (%R)<br>(Limits) | MSD (%R)<br>(Limits) | RPD<br>(Limits) | Flag            | A or P |
|--|-----------------------|---------------------|----------------------|-----------------|-----------------|--------|
| JP-M13-GWMW808MS/MSD<br>(JP-M13-GWMW808) | HMX                   | 133 (80-115)        | 134 (80-115)         | -               | J (all detects) | A      |
|  | 1,3,5-Trinitrobenzene | 142 (65-140)        | -                    | -               | J (all detects) |        |
|  | 4-Nitrotoluene        | 137 (50-130)        | 137 (50-130)         | -               | J (all detects) |        |

## **VII. Laboratory Control Samples**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## **VIII. Target Compound Identification**

Raw data were not reviewed for this SDG.

## **IX. Compound Quantitation and RLs**

Raw data were not reviewed for this SDG.

## **X. System Performance**

Raw data were not reviewed for this SDG.

## **XI. Overall Assessment of Data**

Data flags are summarized at the end of this report if data has been qualified.

## **XII. Field Duplicates**

Samples JP-M13-GWMW809 and JP-M13-GWMW999 were identified as field duplicates. No explosives were detected in any of the samples.

**JOAAP-GW****Explosives - Data Qualification Summary - SDG 500-44539-1**

| SDG         | Sample         | Compound                                       | Flag  | A or P | Reason                                   |
|-------------|----------------|--|---|--------|--|
| 500-44539-1 | JP-M13-GWMW808 | HMX<br>1,3,5-Trinitrobenzene<br>4-Nitrotoluene | J (all detects)<br>J (all detects)<br>J (all detects) | A      | Matrix spike/Matrix spike duplicate (%R) |

**JOAAP-GW****Explosives - Laboratory Blank Data Qualification Summary - SDG 500-44539-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Explosives - Field Blank Data Qualification Summary - SDG 500-44539-1**

No Sample Data Qualified in this SDG

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-44539-1

Date Sampled: 02/29/2012 1000

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-142553 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-142545 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 03/07/2012 1746 |                 |            | Injection Volume:      | 100 µL    |
| Prep Date:       | 03/07/2012 0840 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 113  |           | 70 - 130          |

02/10/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-44539-2

Date Sampled: 02/29/2012 1120

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-142553 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-142545 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 03/07/2012 1837 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 03/07/2012 0840 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | 1.5           |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | 0.83          |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | 0.78          |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 109  |           | 70 - 130          |

CEY/10/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-44539-3

Date Sampled: 02/29/2012 1300

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-142553 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-142545 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 03/07/2012 1929 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 03/07/2012 0840 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 111  |           | 70 - 130          |

*024/10/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-44539-4

Date Sampled: 02/29/2012 1350

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-142553 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-142545 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 03/07/2012 2020 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 03/07/2012 0840 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 109  |           | 70 - 130          |

cey/10/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-44539-5

Date Sampled: 02/29/2012 1700

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-142553 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-142545 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 03/07/2012 2112 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 03/07/2012 0840 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL               | RL   |
|----------------------------|---------------|-----------|-------------------|------|
| HMX                        | <0.31         |           | 0.12              | 0.31 |
| RDX                        | <0.16         |           | 0.077             | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039             | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033             | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032             | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036             | 0.16 |
| Tetryl                     | <0.39         |           | 0.065             | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032             | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071             | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035             | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074             | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082             | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082             | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14              | 0.31 |
| Surrogate                  | %Rec          | Qualifier | Acceptance Limits |      |
| 1,2-Dinitrobenzene         | 109           |           | 70 - 130          |      |

*03/10/12*

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-44539-6

Date Sampled: 02/29/2012 1200

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-142553 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-142545 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 03/07/2012 2203 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 03/07/2012 0840 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 111  |           | 70 - 130          |

024/10/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44539-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-44539-7

Date Sampled: 02/29/2012 1510

Client Matrix: Water

Date Received: 03/01/2012 0947

## 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-142553 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-142545 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 03/07/2012 2255 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 03/07/2012 0840 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 101  |           | 70 - 130          |

02/10/12

LDC #: 27391A40

**VALIDATION COMPLETENESS WORKSHEET**

SDG #: 500-44539-1

Level III

Laboratory: Test America, Inc.

Date: 4/03/12

Page: 1 of 1

Reviewer: AA

2nd Reviewer: JVG

**METHOD:** HPLC Explosives (EPA SW 846 Method 8330)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                      |                                | Comments                 |
|-------|--------------------------------------|--------------------------------|--------------------------|
| I.    | Technical holding times              | A                              | Sampling dates: 02/29/12 |
| II.   | Initial calibration                  | A                              | 1. RSD $\leq$ 20%.       |
| III.  | Calibration verification/ICV         | A                              | 1. D $\leq$ 15%.         |
| IV.   | Blanks                               | A                              |                          |
| V.    | Surrogate recovery                   | A                              |                          |
| VI.   | Matrix spike/Matrix spike duplicates | SW                             |                          |
| VII.  | Laboratory control samples           | A <del>SW</del> <del>LC5</del> | LC5 ONLY                 |
| VIII. | Target compound identification       | N                              |                          |
| IX.   | Compound quantitation/RL/LOQ/LODs    | N                              |                          |
| X.    | System Performance                   | N                              |                          |
| XI.   | Overall assessment of data           | A                              |                          |
| XII.  | Field duplicates                     | ND                             | FD = 5, 10               |
| XIII. | Field blanks                         | N                              |                          |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples: WATER

|    |                   |    |           |    |  |    |  |
|----|-------------------|----|-----------|----|--|----|--|
| 1  | JP-M13-GWMW126R   | 11 | 142545 MB | 21 |  | 31 |  |
| 2  | JP-M13-GWMW362    | 12 |           | 22 |  | 32 |  |
| 3  | JP-M13-GWMW806    | 13 |           | 23 |  | 33 |  |
| 4  | JP-M13-GWMW807    | 14 |           | 24 |  | 34 |  |
| 5  | JP-M13-GWMW809    | 15 |           | 25 |  | 35 |  |
| 6  | JP-M13-GWMW999    | 16 |           | 26 |  | 36 |  |
| 7  | JP-M13-GWMW808    | 17 |           | 27 |  | 37 |  |
| 8  | JP-M13-GWMW808MS  | 18 |           | 28 |  | 38 |  |
| 9  | JP-M13-GWMW808MSD | 19 |           | 29 |  | 39 |  |
| 10 |                   | 20 |           | 30 |  | 40 |  |

Notes: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# VALIDATION FINDINGS WORKSHEET

METHOD: GC / HPLC

| 8310                      | 8330                          | 8151                 | 8141                | 8141(Con't)           | 8021B             |
|---------------------------|-------------------------------|----------------------|---------------------|-----------------------|-------------------|
| A. Acenaphthene           | A. HMX                        | A. 2,4-D             | A. Dichlorvos       | V. Fensulfothion      | V. Benzene        |
| B. Acenaphthylene         | B. RDX                        | B. 2,4-DB            | B. Mevinphos        | W. Bolstar            | CC. Toluene       |
| C. Anthracene             | C. 1,3,5-Trinitrobenzene      | C. 2,4,5-T           | C. Demeton-O        | X. EPN                | EE. Ethyl Benzene |
| D. Benzo(a)anthracene     | D. 1,3-Dinitrobenzene         | D. 2,4,5-TP          | D. Demeton-S        | Y. Azinphos-methyl    | SSS. O-Xylene     |
| E. Benzo(a)pyrene         | E. Tetral                     | E. Dinoseb           | E. Ethoprop         | Z. Coumaphos          | RRR. MP-Xylene    |
| F. Benzo(b)fluoranthene   | F. Nitrobenzene               | F. Dichlorprop       | F. Naled            | AA. Parathion         | GG. Total Xylene  |
| G. Benzo(g,h,i)perylene   | G. 2,4,6-Trinitrotoluene      | G. Dicamba           | G. Sulfotep         | BB. Trichloronate     |                   |
| H. Benzo(k)fluoranthene   | H. 4-Amino-2,6-dinitrotoluene | H. Dalapon           | H. Phorate          | CC. Trichlorinate     |                   |
| I. Chrysene               | I. 2-Amino-4,6-dinitrotoluene | I. MCP               | I. Dimethoate       | DD. Trifluralin       |                   |
| J. Dibenzo(a,h)anthracene | J. 2,4-Dinitrotoluene         | J. MCPA              | J. Diazinon         | EE. Def               |                   |
| K. Fluoranthene           | K. 2,6-Dinitrotoluene         | K. Pentachlorophenol | K. Disulfoton       | FF. Prowl             |                   |
| L. Fluorene               | L. 2-Nitrotoluene             | L. 2,4,5-TP (silvex) | L. Parathion-methyl | GG. Ethion            |                   |
| M. Indeno(1,2,3-cd)pyrene | M. 3-Nitrotoluene             | M. Silvex            | M. Ronnel           | HH. Famphur           |                   |
| N. Naphthalene            | N. 4-Nitrotoluene             |                      | N. Malathion        | II. Phosmet           |                   |
| O. Phenanthrene           | O. Nitroglycerin              |                      | O. Chlorpyrifos     | JJ. Tetrachlorvinphos |                   |
| P. Pyrene                 | P. 1,2-DINITROBENZENE         |                      | P. Fenthion         | KK. Demeton (total)   |                   |
| Q.                        | Q                             |                      | Q. Parathion-ethyl  |                       |                   |
| R.                        |                               |                      | R. Trichlorate      |                       |                   |
| S.                        |                               |                      | S. Merphos          |                       |                   |
|                           |                               |                      | T. Stirofos         |                       |                   |
|                           |                               |                      | U. Tokuthion        |                       |                   |

Notes:



**Laboratory Data Consultants, Inc.  
Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** March 1, 2012  
**LDC Report Date:** April 5, 2012  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-44555-1

**Sample Identification**

JP-M13-GWMWAEHA 15  
JP-M13-GWMWAEHA 14R  
Trip Blank

## Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination ( $r^2$ ) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds with the following exceptions:

| Date    | Compound                  | %D   | Associated Samples                | Flag                                    | A or P |
|---------|---------------------------|------|-----------------------------------|---|--------|
| 3/14/12 | Dichlorodifluoromethane   | 25.8 | All samples in SDG<br>500-44555-1 | J (all detects)<br>UJ (all non-detects) | A      |
|         | Vinyl acetate             | 20.3 |                                   |   |        |
|         | cis-1,3-Dichloropropene   | 27.3 |                                   |   |        |
|         | 4-Methyl-2-pentanone      | 26.8 |                                   |   |        |
|         | 1,1,1-Trichloroethane     | 32.9 |                                   |   |        |
|         | 1,1,2-Trichloroethane     | 22.5 |                                   |   |        |
|         | 2-Hexanone                | 29.6 |                                   |   |        |
|         | 1,2-Dibromoethane         | 24.6 |                                   |   |        |
|         | 1,1,2,2-Tetrachloroethane | 21.9 |                                   |   |        |
|         | n-Propylbenzene           | 23.5 |                                   |   |        |
|         | Hexachlorobutadiene       | 30.6 |                                   |   |        |
|         | 1,2,3-Trichlorobenzene    | 32.5 |                                   |   |        |

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds with the following exceptions:

| Date    | Compound                | %D   | Associated Samples             | Flag  | A or P |
|---------|-------------------------|------|--------------------------------|---|--------|
| 2/20/12 | Dichlorodifluoromethane | 27.6 | All samples in SDG 500-44555-1 | J (all detects)   | A      |
|         | Chloromethane           | 21.7 |                                | UJ (all non-detects)<br>J (all detects)<br>UJ (all non-detects) |        |

All of the continuing calibration relative response factors (RRF) for were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

Sample "Trip Blank" was identified as a trip blank. No volatile contaminants were found.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

| LCS ID       | Compound      | %R (Limits)  | Associated Samples            | Flag            | A or P |
|--------------|---------------|--------------|-------------------------------|-----------------|--------|
| 500-143093/4 | Vinyl acetate | 125 (45-121) | All samples in SD 500-44555-1 | J (all detects) | P      |

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits.

#### **XI. Target Compound Identifications**

Raw data were not reviewed for this SDG.

#### **XII. Compound Quantitation and RLs**

Raw data were not reviewed for this SDG.

#### **XIII. Tentatively Identified Compounds (TICs)**

Raw data were not reviewed for this SDG.

#### **XIV. System Performance**

Raw data were not reviewed for this SDG.

#### **XV. Overall Assessment of Data**

Data flags are summarized at the end of this report if data has been qualified.

#### **XVI. Field Duplicates**

No field duplicates were identified in this SDG.

**JOAAP-GW****Volatiles - Data Qualification Summary - SDG 500-44555-1**

| SDG         | Sample  | Compound  | Flag   | A or P | Reason                          |
|-------------|---|---|--|--------|---------------------------------|
| 500-44555-1 | JP-M13-GWMWAEHA 15<br>JP-M13-GWMWAEHA 14R<br>Trip Blank | Dichlorodifluoromethane<br>Vinyl acetate<br>cis-1,3-Dichloropropene<br>4-Methyl-2-pentanone<br>1,1,1-Trichloroethane<br>1,1,2-Trichloroethane<br>2-Hexanone<br>1,2-Dibromoethane<br>1,1,2,2-Tetrachloroethane<br>n-Propylbenzene<br>Hexachlorobutadiene<br>1,2,3-Trichlorobenzene | J (all detects)<br>UJ (all non-detects)  | A      | Continuing calibration (%D)     |
| 500-44555-1 | JP-M13-GWMWAEHA 15<br>JP-M13-GWMWAEHA 14R<br>Trip Blank | Dichlorodifluoromethane<br>Chloromethane  | J (all detects)<br>UJ (all non-detects)<br>J (all detects)<br>UJ (all non-detects) | A      | Continuing calibration (ICV %D) |
| 500-44555-1 | JP-M13-GWMWAEHA 15<br>JP-M13-GWMWAEHA 14R<br>Trip Blank | Vinyl acetate   | J (all detects)  | P      | Laboratory control samples (%R) |

**JOAAP-GW****Volatiles - Laboratory Blank Data Qualification Summary - SDG 500-44555-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Volatiles - Field Blank Data Qualification Summary - SDG 500-44555-1**

No Sample Data Qualified in this SDG

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: JP-M13-GWMWAEHA 15

Lab Sample ID: 500-44555-1

Date Sampled: 03/01/2012 0900

Client Matrix: Water

Date Received: 03/01/2012 1505

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-143093

Instrument ID: CMS18

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 44555-01.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 03/14/2012 0802

Final Weight/Volume: 5 mL

Prep Date: 03/14/2012 0802

| Analyte                     | Result (ug/L)  | Qualifier | MDL  | RL  |
|-----------------------------|----------------|-----------|------|-----|
| Acetone                     | <5.0           |           | 1.9  | 5.0 |
| Benzene                     | <1.0           |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0           |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0           |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0           |           | 0.23 | 1.0 |
| Bromoform                   | <1.0           |           | 0.45 | 1.0 |
| Bromomethane                | <1.4           |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0           |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0           |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0           |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0           |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0           |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0           |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0           |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0           |           | 0.25 | 1.0 |
| Chloroethane                | <1.4           |           | 0.33 | 1.4 |
| Chloroform                  | <1.0           |           | 0.25 | 1.0 |
| Chloromethane               | <1.0 <i>US</i> |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0 <i>US</i> | *         | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6           |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0 <i>US</i> |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0           |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0           |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0           |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0           |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0 <i>US</i> |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0           |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0           |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0           |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0           |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0           |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0           |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0           |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0           |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0           |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0 <i>US</i> |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0           |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0           |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0 <i>US</i> |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0 <i>US</i> |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0           |           | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0           |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0           |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0 <i>US</i> |           | 0.79 | 5.0 |

024612

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: JP-M13-GWMWAEHA 15

Lab Sample ID: 500-44555-1

Date Sampled: 03/01/2012 0900

Client Matrix: Water

Date Received: 03/01/2012 1505

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-143093

Instrument ID: CMS18

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 44555-01.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 03/14/2012 0802

Final Weight/Volume: 5 mL

Prep Date: 03/14/2012 0802

| Analyte                   | Result (ug/L)  | Qualifier | MDL  | RL  |
|---------------------------|----------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0           |           | 0.28 | 1.0 |
| Naphthalene               | <1.0           |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0 <i>US</i> |           | 0.19 | 1.0 |
| Styrene                   | <1.0           |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0           |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0 <i>US</i> |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0           |           | 0.22 | 1.0 |
| Toluene                   | <1.0           |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0 <i>US</i> |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0           |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0 <i>US</i> |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0 <i>US</i> |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0           |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0           |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2           |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0           |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0           |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0           |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0           |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0           |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0           |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 94   |           | 75 - 120          |
| Dibromofluoromethane         | 102  |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 85   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 97   |           | 85 - 120          |

024/6/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: JP-M13-GWMWAEHA 14R

Lab Sample ID: 500-44555-2

Date Sampled: 03/01/2012 1200

Client Matrix: Water

Date Received: 03/01/2012 1505

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-143093

Instrument ID: CMS18

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 44555-02.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 03/14/2012 0827

Final Weight/Volume: 5 mL

Prep Date: 03/14/2012 0827

| Analyte                     | Result (ug/L) | Qualifier | MDL  | RL  |
|-----------------------------|---------------|-----------|------|-----|
| Acetone                     | <5.0          |           | 1.9  | 5.0 |
| Benzene                     | <1.0          |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0          |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0          |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0          |           | 0.23 | 1.0 |
| Bromoform                   | <1.0          |           | 0.45 | 1.0 |
| Bromomethane                | <1.4          |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0          |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0          |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0          |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0          |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0          |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0          |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0          |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0          |           | 0.25 | 1.0 |
| Chloroethane                | <1.4          |           | 0.33 | 1.4 |
| Chloroform                  | <1.0          |           | 0.25 | 1.0 |
| Chloromethane               | <1.0 <i>✓</i> |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0 <i>✓</i> | *         | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6          |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0 <i>✓</i> |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0          |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0          |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0          |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0          |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0 <i>✓</i> |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0          |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0          |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0          |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0          |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0          |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0          |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0          |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0          |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0          |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0 <i>✓</i> |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0          |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0          |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0 <i>✓</i> |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0 <i>✓</i> |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0          |           | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0          |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0          |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0 <i>✓</i> |           | 0.79 | 5.0 |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: JP-M13-GWMWAEHA 14R

Lab Sample ID: 500-44555-2

Date Sampled: 03/01/2012 1200

Client Matrix: Water

Date Received: 03/01/2012 1505

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-143093

Instrument ID: CMS18

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 44555-02.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 03/14/2012 0827

Final Weight/Volume: 5 mL

Prep Date: 03/14/2012 0827

| Analyte                   | Result (ug/L)  | Qualifier | MDL  | RL  |
|---------------------------|----------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0           |           | 0.28 | 1.0 |
| Naphthalene               | <1.0           |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0 <i>JS</i> |           | 0.19 | 1.0 |
| Styrene                   | <1.0           |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0           |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0 <i>JS</i> |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0           |           | 0.22 | 1.0 |
| Toluene                   | <1.0           |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0 <i>JS</i> |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0           |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0 <i>JS</i> |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0 <i>JS</i> |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0           |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0           |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2           |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0           |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0           |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0           |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0           |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0           |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0           |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 101  |           | 75 - 120          |
| Dibromofluoromethane         | 112  |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 96   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 98   |           | 85 - 120          |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: Trip Blank

Lab Sample ID: 500-44555-3TB

Date Sampled: 03/01/2012 0000

Client Matrix: Water

Date Received: 03/01/2012 1505

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-143093

Instrument ID: CMS18

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 44555-03.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 03/14/2012 0852

Final Weight/Volume: 5 mL

Prep Date: 03/14/2012 0852

| Analyte                     | Result (ug/L)  | Qualifier | MDL  | RL  |
|-----------------------------|----------------|-----------|------|-----|
| Acetone                     | <5.0           |           | 1.9  | 5.0 |
| Benzene                     | <1.0           |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0           |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0           |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0           |           | 0.23 | 1.0 |
| Bromoform                   | <1.0           |           | 0.45 | 1.0 |
| Bromomethane                | <1.4           |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0           |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0           |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0           |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0           |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0           |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0           |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0           |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0           |           | 0.25 | 1.0 |
| Chloroethane                | <1.4           |           | 0.33 | 1.4 |
| Chloroform                  | <1.0           |           | 0.25 | 1.0 |
| Chloromethane               | <1.0 <i>us</i> |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0 <i>us</i> | *         | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0           |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6           |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0 <i>us</i> |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0           |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0           |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0           |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0           |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0 <i>us</i> |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0           |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0           |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0           |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0           |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0           |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0           |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0           |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0           |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0           |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0 <i>us</i> |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0           |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0           |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0 <i>us</i> |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0 <i>us</i> |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0           |           | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0           |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0           |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0 <i>us</i> |           | 0.79 | 5.0 |

*024/6/12*

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: Trip Blank

Lab Sample ID: 500-44555-3TB

Client Matrix: Water

Date Sampled: 03/01/2012 0000

Date Received: 03/01/2012 1505

## 8260B VOC

|                  |                 |                 |            |                        |            |
|------------------|-----------------|-----------------|------------|------------------------|------------|
| Analysis Method: | 8260B           | Analysis Batch: | 500-143093 | Instrument ID:         | CMS18      |
| Prep Method:     | 5030B           | Prep Batch:     | N/A        | Lab File ID:           | 44555-03.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 5 mL       |
| Analysis Date:   | 03/14/2012 0852 |                 |            | Final Weight/Volume:   | 5 mL       |
| Prep Date:       | 03/14/2012 0852 |                 |            |                        |            |

| Analyte                   | Result (ug/L)  | Qualifier | MDL  | RL  |
|---------------------------|----------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0           |           | 0.28 | 1.0 |
| Naphthalene               | <1.0           |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0 <i>US</i> |           | 0.19 | 1.0 |
| Styrene                   | <1.0           |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0           |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0 <i>US</i> |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0           |           | 0.22 | 1.0 |
| Toluene                   | <1.0           |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0 <i>US</i> |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0           |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0 <i>US</i> |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0 <i>US</i> |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0           |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0           |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2           |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0           |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0           |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0           |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0           |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0           |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0           |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 95   |           | 75 - 120          |
| Dibromofluoromethane         | 108  |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 88   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 103  |           | 85 - 120          |

024/6/12

LDC #: 27391B1

**VALIDATION COMPLETENESS WORKSHEET**

Date: 4/5/12

SDG #: 500-44555-1

Level III

Page: 1 of 1

Laboratory: Test America, Inc.

Reviewer: BR

2nd Reviewer: L

**METHOD:** GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                                |    | Comments                  |
|-------|--|----|---------------------------|
| I.    | Technical holding times                        | A  | Sampling dates: 03/01/12  |
| II.   | GC/MS Instrument performance check             | A  |                           |
| III.  | Initial calibration                            | A  | $RSD \leq 30/152$ , $r^2$ |
| IV.   | Continuing calibration/ICV                     | SW | $ICV/CCV \leq 20\%$       |
| V.    | Blanks   | A  |                           |
| VI.   | Surrogate spikes                               | A  |                           |
| VII.  | Matrix spike/Matrix spike duplicates           | N  | Client spec.              |
| VIII. | Laboratory control samples                     | SW | LCS                       |
| IX.   | Regional Quality Assurance and Quality Control | N  |                           |
| X.    | Internal standards                             | A  |                           |
| XI.   | Target compound identification                 | N  |                           |
| XII.  | Compound quantitation/RL/LOQ/LODs              | N  |                           |
| XIII. | Tentatively identified compounds (TICs)        | N  |                           |
| XIV.  | System performance                             | N  |                           |
| XV.   | Overall assessment of data                     | A  |                           |
| XVI.  | Field duplicates                               | N  |                           |
| XVII. | Field blanks                                   | ND | TB = 1                    |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples: Water

|    |                     |    |               |    |  |    |  |
|----|---------------------|----|---------------|----|--|----|--|
| 1  | JP-M13-GWMWAEHA 15  | 11 | 500-143093-MB | 21 |  | 31 |  |
| 2  | JP-M13-GWMWAEHA 14R | 12 |               | 22 |  | 32 |  |
| 3  | Trip Blank          | 13 |               | 23 |  | 33 |  |
| 4  |                     | 14 |               | 24 |  | 34 |  |
| 5  |                     | 15 |               | 25 |  | 35 |  |
| 6  |                     | 16 |               | 26 |  | 36 |  |
| 7  |                     | 17 |               | 27 |  | 37 |  |
| 8  |                     | 18 |               | 28 |  | 38 |  |
| 9  |                     | 19 |               | 29 |  | 39 |  |
| 10 |                     | 20 |               | 30 |  | 40 |  |

# TARGET COMPOUND WORKSHEET

## METHOD: VOA (EPA SW 846 Method 8260B)

|                              |                                 |                               |  |                         |
|------------------------------|---------------------------------|-------------------------------|--|-------------------------|
| A. Chloromethane*            | U. 1,1,2-Trichloroethane        | OO. 2,2-Dichloropropane       | III. n-Butylbenzene                        | CCCC. 1-Chlorohexane    |
| B. Bromomethane              | V. Benzene                      | PP. Bromochloromethane        | JJJ. 1,2-Dichlorobenzene                   | DDDD. Isopropyl alcohol |
| C. Vinyl chloride**          | W. trans-1,3-Dichloropropene    | QQ. 1,1-Dichloropropene       | KKK. 1,2,4-Trichlorobenzene                | EEEE. Acetonitrile      |
| D. Chloroethane              | X. Bromoform*                   | RR. Dibromomethane            | LLL. Hexachlorobutadiene                   | FFFF. Acrolein          |
| E. Methylene chloride        | Y. 4-Methyl-2-pentanone         | SS. 1,3-Dichloropropane       | MMM. Naphthalene                           | GGGG. Acrylonitrile     |
| F. Acetone                   | Z. 2-Hexanone                   | TT. 1,2-Dibromoethane         | NNN. 1,2,3-Trichlorobenzene                | HHHH. 1,4-Dioxane       |
| G. Carbon disulfide          | AA. Tetrachloroethene           | UU. 1,1,1,2-Tetrachloroethane | OOO. 1,3,5-Trichlorobenzene                | IIII. Isobutyl alcohol  |
| H. 1,1-Dichloroethene**      | BB. 1,1,2,2-Tetrachloroethane*  | VV. Isopropylbenzene          | PPP. trans-1,2-Dichloroethene              | JJJJ. Methacrylonitrile |
| I. 1,1-Dichloroethane*       | CC. Toluene**                   | WW. Bromobenzene              | QQQ. cis-1,2-Dichloroethene                | KKKK. Propionitrile     |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene*              | XX. 1,2,3-Trichloropropane    | RRR. m,p-Xylenes                           | LLLL. Ethyl ether       |
| K. Chloroform**              | EE. Ethylbenzene**              | YY. n-Propylbenzene           | SSS. o-Xylene                              | MMMM. Benzyl chloride   |
| L. 1,2-Dichloroethane        | FF. Styrene                     | ZZ. 2-Chlorotoluene           | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN.                   |
| M. 2-Butanone                | GG. Xylenes, total              | AAA. 1,3,5-Trimethylbenzene   | UUU. 1,2-Dichlorotetrafluoroethane         | OOOO.                   |
| N. 1,1,1-Trichloroethane     | HH. Vinyl acetate               | BBB. 4-Chlorotoluene          | VVV. 4-Ethyltoluene                        | PPPP.                   |
| O. Carbon tetrachloride      | II. 2-Chloroethylvinyl ether    | CCC. tert-Butylbenzene        | WWW. Ethanol                               | QQQQ.                   |
| P. Bromodichloromethane      | JJ. Dichlorodifluoromethane     | DDD. 1,2,4-Trimethylbenzene   | XXX. Di-isopropyl ether                    | RRRR.                   |
| Q. 1,2-Dichloropropane**     | KK. Trichlorofluoromethane      | EEE. sec-Butylbenzene         | YYY. tert-Butanol                          | SSSS.                   |
| R. cis-1,3-Dichloropropene   | LL. Methyl-tert-butyl ether     | FFF. 1,3-Dichlorobenzene      | ZZZ. tert-Butyl alcohol                    | TTTT.                   |
| S. Trichloroethene           | MM. 1,2-Dibromo-3-chloropropane | GGG. p-Isopropyltoluene       | AAAA. Ethyl tert-butyl ether               | UUUU.                   |
| T. Dibromochloromethane      | NN. Methyl ethyl ketone         | HHH. 1,4-Dichlorobenzene      | BBBB. tert-Amyl methyl ether               | VVVV.                   |

\* = System performance check compounds (SPCC) for RRF ; \*\* = Calibration check compounds (CCC) for %RSD.



Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Was a LCS required?  
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

LCSLCSD.1SB

**Laboratory Data Consultants, Inc.  
Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** March 1, 2012  
**LDC Report Date:** April 5, 2012  
**Matrix:** Water  
**Parameters:** Semivolatiles  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-44555-1

**Sample Identification**

JP-M13-GWMWAEHA 15  
JP-M13-GWMWAEHA 14R  
JP-M13-GWMWAEHA 14RRE

## Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met with the following exceptions:

| Sample                | Compound          | Total Days From Sample Collection Until Extraction | Required Holding Time (in Days) From Sample Collection Until Extraction | Flag                                    | A or P |
|-----------------------|-------------------|--|---|---|--------|
| JP-M13-GWMWAEHA 14RRE | All TCL compounds | 18   | 7   | J (all detects)<br>UJ (all non-detects) | A      |

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs) with the following exceptions:

| Date    | Compound   | %RSD   | Associated Samples                | Flag                                    | A or P |
|---------|--|--|-----------------------------------|---|--------|
| 3/15/12 | 3&4-Methylphenol<br>Benzoic acid<br>Fluorene<br>Butylbenzylphthalate<br>Bis(2-ethylhexyl)phthalate<br>Benzo(k)fluoranthene | 17.0<br>25.0<br>16.0<br>18.0<br>20.0<br>19.0 | All samples in SDG<br>500-44555-1 | J (all detects)<br>UJ (all non-detects) | A      |

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination ( $r^2$ ) were greater than or equal to 0.990 .

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds with the following exceptions:

| Date    | Compound                 | %D   | Associated Samples                     | Flag                                    | A or P |
|---------|--------------------------|------|--|---|--------|
| 3/20/12 | Bis(2-chloroethyl) ether | 25.5 | JP-M13-GWMWAEHA 14RRE<br>500-143645-MB | J (all detects)<br>UJ (all non-detects) | A      |

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds with the following exceptions:

| Date    | Compound   | %D   | Associated Samples                | Flag                                    | A or P |
|---------|--|--|-----------------------------------|---|--------|
| 3/15/12 | 4-Chlorophenyl-phenyl ether<br>2,4-Dimethylphenol<br>2-Methylnaphthalene<br>2,4,6-Trichlorophenol<br>2-Chloronaphthalene<br>Acenaphthene<br>2,4-Dinitrophenol<br>4-Nitrophenol<br>Fluorene<br>N-Nitrosodiphenylamine<br>4-Bromophenyl-phenyl ether<br>Hexachlorobenzene<br>Phenanthrene<br>Anthracene<br>Carbazole<br>Benzo(a)anthracene | 20.2<br>21.5<br>23.4<br>22.2<br>20.6<br>20.5<br>25.8<br>20.5<br>22.1<br>23.8<br>21.3<br>24.0<br>21.9<br>21.7<br>20.5<br>21.8 | All samples in SDG<br>500-44555-1 | J (all detects)<br>UJ (all non-detects) | A      |

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No semivolatile contaminants were found in the method blanks.

No field blanks were identified in this SDG.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

| Sample              | Surrogate  | %R (Limits)   | Compound          | Flag                                   | A or P |
|---------------------|--|---|-------------------|--|--------|
| JP-M13-GWMWAEHA 14R | 2-Fluorophenol<br>Phenol-d5<br>Nitrobenzene-d5<br>2-Fluorobiphenyl | 3 (20-110)<br>7 (10-115)<br>5 (40-110)<br>38 (50-110) | All TCL compounds | J (all detects)<br>R (all non-detects) | A      |

## VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| LCS ID<br>(Associated<br>Samples)                        | Compound   | LCS<br>%R (Limits) | LCSD<br>%R (Limits) | RPD<br>(Limits)   | Flag                                    | A or P |
|--|--|--------------------|---------------------|---|---|--------|
| 500-143645/2-A<br>(JP-M13-GWMWAEHA 14R<br>500-143645-MB) | Benzidine<br>Benzoic acid<br>2-Nitroaniline<br>4-Nitrophenol | -<br>-<br>-<br>-   | -<br>-<br>-<br>-    | 27 ( $\leq 20$ )<br>116 ( $\leq 20$ )<br>25 ( $\leq 20$ )<br>27 ( $\leq 20$ ) | J (all detects)<br>UJ (all non-detects) | P      |

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

| Sample              | Internal Standards           | Area (Limits)                                     | Compound   | Flag                                    | A or P |
|---------------------|------------------------------|---|--|---|--------|
| JP-M13-GWMWAEHA 14R | Chrysene-d12<br>Perylene-d12 | 276691 (284090-1136358)<br>218084 (342810-685619) | Pyrene<br>Butylbenzylphthalate<br>3,3'-Dichlorobenzidine<br>Benzo(a)anthracene<br>Chrysene<br>Bis(2-ethylhexyl)phthalate<br>Benzidine<br>Di-n-octylphthalate<br>Benzo(b)fluoranthene<br>Benzo(k)fluoranthene<br>Benzo(a)pyrene<br>Indeno(1,2,3-cd)pyrene<br>Dibenzo(a,h)anthracene<br>Benzo(g,h,i)perylene | J (all detects)<br>UJ (all non-detects) | A      |

#### **XI. Target Compound Identifications**

Raw data were not reviewed for this SDG.

#### **XII. Compound Quantitation and RLs**

Raw data were not reviewed for this SDG.

#### **XIII. Tentatively Identified Compounds (TICs)**

Raw data were not reviewed for this SDG.

#### **XIV. System Performance**

Raw data were not reviewed for this SDG.

#### **XV. Overall Assessment**

Data flags are summarized at the end of this report if data has been qualified.

#### **XVI. Field Duplicates**

No field duplicates were identified in this SDG.

## JOAAP-GW

## Semivolatiles - Data Qualification Summary - SDG 500-44555-1

| SDG         | Sample   | Compound   | Flag                                    | A or P | Reason                           |
|-------------|--|--|---|--------|----------------------------------|
| 500-44555-1 | JP-M13-GWMWAEHA 14RRE  | All TCL compounds  | J (all detects)<br>UJ (all non-detects) | A      | Technical holding time           |
| 500-44555-1 | JP-M13-GWMWAEHA 15<br>JP-M13-GWMWAEHA 14R<br>JP-M13-GWMWAEHA 14RRE | 3&4-Methylphenol<br>Benzoic acid<br>Fluorene<br>Butylbenzylphthalate<br>Bis(2-ethylhexyl)phthalate<br>Benzo(k)fluoranthene   | J (all detects)<br>UJ (all non-detects) | A      | Initial calibration (%RSD)       |
| 500-44555-1 | JP-M13-GWMWAEHA 14RRE  | Bis(2-chloroethyl) ether   | J (all detects)<br>UJ (all non-detects) | A      | Continuing calibration (%D)      |
| 500-44555-1 | JP-M13-GWMWAEHA 15<br>JP-M13-GWMWAEHA 14R<br>JP-M13-GWMWAEHA 14RRE | 4-Chlorophenyl-phenyl ether<br>2,4-Dimethylphenol<br>2-Methylnaphthalene<br>2,4,6-Trichlorophenol<br>2-Chloronaphthalene<br>Acenaphthene<br>2,4-Dinitrophenol<br>4-Nitrophenol<br>Fluorene<br>N-Nitrosodiphenylamine<br>4-Bromophenyl-phenyl ether<br>Hexachlorobenzene<br>Phenanthrene<br>Anthracene<br>Carbazole<br>Benzo(a)anthracene | J (all detects)<br>UJ (all non-detects) | A      | Continuing calibration (ICV %D)  |
| 500-44555-1 | JP-M13-GWMWAEHA 14R  | All TCL compounds  | J (all detects)<br>R (all non-detects)  | A      | Surrogate spikes (%R)            |
| 500-44555-1 | JP-M13-GWMWAEHA 14R  | Benzidine<br>Benzoic acid<br>2-Nitroaniline<br>4-Nitrophenol   | J (all detects)<br>UJ (all non-detects) | P      | Laboratory control samples (RPD) |
| 500-44555-1 | JP-M13-GWMWAEHA 14R  | Pyrene<br>Butylbenzylphthalate<br>3,3'-Dichlorobenzidine<br>Benzo(a)anthracene<br>Chrysene<br>Bis(2-ethylhexyl)phthalate<br>Benzidine<br>Di-n-octylphthalate<br>Benzo(b)fluoranthene<br>Benzo(k)fluoranthene<br>Benzo(a)pyrene<br>Indeno(1,2,3-cd)pyrene<br>Dibenzo(a,h)anthracene<br>Benzo(g,h,i)perylene                               | J (all detects)<br>UJ (all non-detects) | A      | Internal standards (area)        |

**JOAAP-GW**

**Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 500-44555-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Semivolatiles - Field Blank Data Qualification Summary - SDG 500-44555-1**

No Sample Data Qualified in this SDG

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: JP-M13-GWMWAEHA 15

Lab Sample ID: 500-44555-1

Date Sampled: 03/01/2012 0900

Client Matrix: Water

Date Received: 03/01/2012 1505

## 8270C SVOC

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8270C         | Analysis Batch: 500-143421 | Instrument ID: CMS23          |
| Prep Method: 3510C             | Prep Batch: 500-142158     | Lab File ID: 44555-1.d        |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 950 mL |
| Analysis Date: 03/16/2012 2042 |                            | Final Weight/Volume: 1.0 mL   |
| Prep Date: 03/02/2012 0915     |                            | Injection Volume: 1 uL        |

| Analyte                      | Result (ug/L)   | Qualifier | MDL   | RL   |
|------------------------------|-----------------|-----------|-------|------|
| Acenaphthene                 | <1.1 <i>US</i>  |           | 0.38  | 1.1  |
| N-Nitrosodimethylamine       | <11 <i>US</i>   |           | 1.4   | 11   |
| Acenaphthylene               | <1.1            |           | 0.34  | 1.1  |
| Anthracene                   | <1.1 <i>US</i>  |           | 0.34  | 1.1  |
| Benzidine                    | <42             |           | 21    | 42   |
| Benzoic acid                 | <21 <i>US</i>   |           | 4.8   | 21   |
| Benzo[a]anthracene           | <0.21 <i>US</i> |           | 0.046 | 0.21 |
| Benzo[b]fluoranthene         | <0.21           |           | 0.061 | 0.21 |
| Benzo[k]fluoranthene         | <0.26 <i>US</i> |           | 0.078 | 0.26 |
| Benzo[g,h,i]perylene         | <1.1            |           | 0.44  | 1.1  |
| Benzo[a]pyrene               | <0.21           |           | 0.059 | 0.21 |
| Benzyl alcohol               | <21             |           | 3.2   | 21   |
| Bis(2-chloroethoxy)methane   | <2.1            |           | 0.32  | 2.1  |
| Bis(2-chloroethyl)ether      | <2.1            |           | 0.37  | 2.1  |
| 2,2'-oxybis[1-chloropropane] | <2.1            |           | 0.32  | 2.1  |
| Bis(2-ethylhexyl) phthalate  | <11 <i>US</i>   |           | 2.6   | 11   |
| 4-Bromophenyl phenyl ether   | <5.3 <i>US</i>  |           | 0.96  | 5.3  |
| Butyl benzyl phthalate       | <2.1 <i>US</i>  |           | 0.28  | 2.1  |
| Carbazole                    | <5.3 <i>US</i>  |           | 1.0   | 5.3  |
| 4-Chloroaniline              | <11             |           | 2.2   | 11   |
| 4-Chloro-3-methylphenol      | <11             |           | 2.3   | 11   |
| 2-Chloronaphthalene          | <2.1 <i>US</i>  |           | 0.36  | 2.1  |
| 2-Chlorophenol               | <5.3            |           | 0.84  | 5.3  |
| 4-Chlorophenyl phenyl ether  | <5.3 <i>US</i>  |           | 0.85  | 5.3  |
| Chrysene                     | <0.53           |           | 0.15  | 0.53 |
| Dibenz(a,h)anthracene        | <0.32           |           | 0.067 | 0.32 |
| Dibenzofuran                 | <2.1            |           | 0.37  | 2.1  |
| Di-n-butyl phthalate         | <5.3            |           | 0.84  | 5.3  |
| 1,2-Dichlorobenzene          | <2.1            |           | 0.31  | 2.1  |
| 1,3-Dichlorobenzene          | <2.1            |           | 0.26  | 2.1  |
| 1,4-Dichlorobenzene          | <2.1            |           | 0.28  | 2.1  |
| 3,3'-Dichlorobenzidine       | <5.3            |           | 0.99  | 5.3  |
| 2,4-Dichlorophenol           | <11             |           | 2.4   | 11   |
| Diethyl phthalate            | <2.1            |           | 0.46  | 2.1  |
| 2,4-Dimethylphenol           | <11 <i>US</i>   |           | 3.5   | 11   |
| Dimethyl phthalate           | <2.1            |           | 0.40  | 2.1  |
| 4,6-Dinitro-2-methylphenol   | <21             |           | 5.2   | 21   |
| 2,4-Dinitrophenol            | <21 <i>US</i>   | ^         | 7.8   | 21   |
| 2,4-Dinitrotoluene           | <1.5            |           | 0.32  | 1.5  |
| 2,6-Dinitrotoluene           | <0.53           |           | 0.13  | 0.53 |
| Di-n-octyl phthalate         | <11             |           | 2.6   | 11   |
| Fluoranthene                 | <1.1            |           | 0.34  | 1.1  |
| Fluorene                     | <1.1 <i>US</i>  |           | 0.40  | 1.1  |
| 1,2-Diphenylhydrazine        | <5.3            |           | 0.74  | 5.3  |
| Hexachlorobenzene            | <0.53 <i>US</i> |           | 0.15  | 0.53 |
| Hexachlorobutadiene          | <5.3            |           | 1.2   | 5.3  |

024/6/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: JP-M13-GMMWAEHA 15

Lab Sample ID: 500-44555-1

Date Sampled: 03/01/2012 0900

Client Matrix: Water

Date Received: 03/01/2012 1505

## 8270C SVOC

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8270C         | Analysis Batch: 500-143421 | Instrument ID: CMS23          |
| Prep Method: 3510C             | Prep Batch: 500-142158     | Lab File ID: 44555-1.d        |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 950 mL |
| Analysis Date: 03/16/2012 2042 |                            | Final Weight/Volume: 1.0 mL   |
| Prep Date: 03/02/2012 0915     |                            | Injection Volume: 1 uL        |

| Analyte                   | Result (ug/L)          | Qualifier | MDL   | RL   |
|---------------------------|------------------------|-----------|-------|------|
| Hexachloroethane          | <5.3                   |           | 1.0   | 5.3  |
| Indeno[1,2,3-cd]pyrene    | <0.26                  |           | 0.088 | 0.26 |
| Isophorone                | <2.1                   |           | 0.31  | 2.1  |
| 2-Methylnaphthalene       | <0.53 <i>VS</i>        |           | 0.14  | 0.53 |
| 2-Methylphenol            | <2.1 <i>VS 0.41612</i> |           | 0.33  | 2.1  |
| 3 & 4 Methylphenol        | <2.1 <i>VS</i>         |           | 0.46  | 2.1  |
| Naphthalene               | <1.1                   |           | 0.32  | 1.1  |
| 2-Nitroaniline            | <5.3                   |           | 1.1   | 5.3  |
| 3-Nitroaniline            | <11                    |           | 2.4   | 11   |
| 4-Nitroaniline            | <11                    |           | 4.1   | 11   |
| Nitrobenzene              | <1.1                   |           | 0.47  | 1.1  |
| 2-Nitrophenol             | <11                    |           | 2.3   | 11   |
| 4-Nitrophenol             | <21 <i>VS</i>          |           | 2.5   | 21   |
| N-Nitrosodiphenylamine    | <1.1                   |           | 0.36  | 1.1  |
| N-Nitrosodi-n-propylamine | <0.53                  |           | 0.15  | 0.53 |
| Pentachlorophenol         | <11                    |           | 5.9   | 11   |
| Phenanthrene              | <1.1 <i>VS</i>         |           | 0.37  | 1.1  |
| Phenol                    | <5.3                   |           | 0.38  | 5.3  |
| Pyrene                    | <1.1                   |           | 0.51  | 1.1  |
| 1,2,4-Trichlorobenzene    | <2.1                   |           | 0.32  | 2.1  |
| 2,4,5-Trichlorophenol     | <11                    |           | 2.4   | 11   |
| 2,4,6-Trichlorophenol     | <5.3 <i>VS</i>         |           | 1.2   | 5.3  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 41   |           | 20 - 110          |
| Phenol-d5            | 28   |           | 10 - 115          |
| Nitrobenzene-d5      | 73   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 79   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 74   |           | 40 - 125          |
| Terphenyl-d14        | 85   |           | 50 - 135          |

*024/6/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: JP-M13-GWMWAEHA 14R

Lab Sample ID: 500-44555-2

Date Sampled: 03/01/2012 1200

Client Matrix: Water

Date Received: 03/01/2012 1505

## 8270C SVOC

Analysis Method: 8270C

Analysis Batch: 500-143421

Instrument ID: CMS23

Prep Method: 3510C

Prep Batch: 500-142158

Lab File ID: 44555-2.d

Dilution: 1.0

Initial Weight/Volume: 1050 mL

Analysis Date: 03/16/2012 2102

Final Weight/Volume: 1.0 mL

Prep Date: 03/02/2012 0915

Injection Volume: 1 uL

| Analyte                      | Result (ug/L) | Qualifier | MDL   | RL   |
|------------------------------|---------------|-----------|-------|------|
| Acenaphthene                 | <0.95         |           | 0.34  | 0.95 |
| N-Nitrosodimethylamine       | <9.5          |           | 1.3   | 9.5  |
| Acenaphthylene               | <0.95         |           | 0.30  | 0.95 |
| Anthracene                   | <0.95         |           | 0.30  | 0.95 |
| Benzidine                    | <38           |           | 19    | 38   |
| Benzoic acid                 | <19           |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19         |           | 0.042 | 0.19 |
| Benzo[b]fluoranthene         | <0.19         |           | 0.055 | 0.19 |
| Benzo[k]fluoranthene         | <0.24         |           | 0.070 | 0.24 |
| Benzo[g,h,i]perylene         | <0.95         |           | 0.40  | 0.95 |
| Benzo[a]pyrene               | <0.19         |           | 0.053 | 0.19 |
| Benzyl alcohol               | <19           |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9          |           | 0.29  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9          |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9          |           | 0.29  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.5          |           | 2.3   | 9.5  |
| 4-Bromophenyl phenyl ether   | <4.8          |           | 0.87  | 4.8  |
| Butyl benzyl phthalate       | <1.9          |           | 0.26  | 1.9  |
| Carbazole                    | <4.8          |           | 0.94  | 4.8  |
| 4-Chloroaniline              | <9.5          |           | 2.0   | 9.5  |
| 4-Chloro-3-methylphenol      | <9.5          |           | 2.1   | 9.5  |
| 2-Chloronaphthalene          | <1.9          |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.8          |           | 0.76  | 4.8  |
| 4-Chlorophenyl phenyl ether  | <4.8          |           | 0.77  | 4.8  |
| Chrysene                     | <0.48         |           | 0.13  | 0.48 |
| Dibenz(a,h)anthracene        | <0.29         |           | 0.061 | 0.29 |
| Dibenzofuran                 | <1.9          |           | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.8          |           | 0.76  | 4.8  |
| 1,2-Dichlorobenzene          | <1.9          |           | 0.28  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9          |           | 0.24  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9          |           | 0.26  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.8          |           | 0.90  | 4.8  |
| 2,4-Dichlorophenol           | <9.5          |           | 2.2   | 9.5  |
| Diethyl phthalate            | <1.9          |           | 0.42  | 1.9  |
| 2,4-Dimethylphenol           | <9.5          |           | 3.2   | 9.5  |
| Dimethyl phthalate           | <1.9          |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19           |           | 4.7   | 19   |
| 2,4-Dinitrophenol            | <19           | A         | 7.1   | 19   |
| 2,4-Dinitrotoluene           | <1.3          |           | 0.29  | 1.3  |
| 2,6-Dinitrotoluene           | <0.48         |           | 0.11  | 0.48 |
| Di-n-octyl phthalate         | <9.5          |           | 2.4   | 9.5  |
| Fluoranthene                 | <0.95         |           | 0.30  | 0.95 |
| Fluorene                     | <0.95         |           | 0.36  | 0.95 |
| 1,2-Diphenylhydrazine        | <4.8          |           | 0.67  | 4.8  |
| Hexachlorobenzene            | <0.48         |           | 0.13  | 0.48 |
| Hexachlorobutadiene          | <4.8          |           | 1.1   | 4.8  |

024/6/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: JP-M13-GWMWAEHA 14R

Lab Sample ID: 500-44555-2

Date Sampled: 03/01/2012 1200

Client Matrix: Water

Date Received: 03/01/2012 1505

## 8270C SVOC

|                                |                            |                                |
|--------------------------------|----------------------------|--------------------------------|
| Analysis Method: 8270C         | Analysis Batch: 500-143421 | Instrument ID: CMS23           |
| Prep Method: 3510C             | Prep Batch: 500-142158     | Lab File ID: 44555-2.d         |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 1050 mL |
| Analysis Date: 03/16/2012 2102 |                            | Final Weight/Volume: 1.0 mL    |
| Prep Date: 03/02/2012 0915     |                            | Injection Volume: 1 uL         |

| Analyte                   | Result (ug/L) | Qualifier | MDL   | RL   |
|---------------------------|---------------|-----------|-------|------|
| Hexachloroethane          | <4.8 R        |           | 0.92  | 4.8  |
| Indeno[1,2,3-cd]pyrene    | <0.24         |           | 0.080 | 0.24 |
| Isophorone                | <1.9          |           | 0.28  | 1.9  |
| 2-Methylnaphthalene       | <0.48         |           | 0.12  | 0.48 |
| 2-Methylphenol            | <1.9          |           | 0.30  | 1.9  |
| 3 & 4 Methylphenol        | <1.9          |           | 0.42  | 1.9  |
| Naphthalene               | 0.32 J        | J         | 0.29  | 0.95 |
| 2-Nitroaniline            | <4.8 R        |           | 1.0   | 4.8  |
| 3-Nitroaniline            | <9.5          |           | 2.2   | 9.5  |
| 4-Nitroaniline            | <9.5          |           | 3.7   | 9.5  |
| Nitrobenzene              | <0.95         |           | 0.43  | 0.95 |
| 2-Nitrophenol             | <9.5          |           | 2.0   | 9.5  |
| 4-Nitrophenol             | <19           |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.95         |           | 0.32  | 0.95 |
| N-Nitrosodi-n-propylamine | <0.48         |           | 0.13  | 0.48 |
| Pentachlorophenol         | <9.5          |           | 5.3   | 9.5  |
| Phenanthrene              | <0.95         |           | 0.33  | 0.95 |
| Phenol                    | <4.8          |           | 0.34  | 4.8  |
| Pyrene                    | <0.95         |           | 0.46  | 0.95 |
| 1,2,4-Trichlorobenzene    | <1.9          |           | 0.29  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.5          |           | 2.2   | 9.5  |
| 2,4,6-Trichlorophenol     | <4.8          |           | 1.0   | 4.8  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 3    | X         | 20 - 110          |
| Phenol-d5            | 7    | X         | 10 - 115          |
| Nitrobenzene-d5      | 5    | X         | 40 - 110          |
| 2-Fluorobiphenyl     | 38   | X         | 50 - 110          |
| 2,4,6-Tribromophenol | 83   |           | 40 - 125          |
| Terphenyl-d14        | 111  |           | 50 - 135          |

02/16/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: JP-M13-GWMWAEHA 14R

Lab Sample ID: 500-44555-2

Date Sampled: 03/01/2012 1200

Client Matrix: Water

Date Received: 03/01/2012 1505

## 8270C SVOC

Analysis Method: 8270C  
 Prep Method: 3510C  
 Dilution: 1.0  
 Analysis Date: 03/20/2012 1739  
 Prep Date: 03/19/2012 1330

Analysis Batch: 500-143761  
 Prep Batch: 500-143645  
 Run Type: RE

Instrument ID: CMS23  
 Lab File ID: 44555-2RE.d  
 Initial Weight/Volume: 1070 mL  
 Final Weight/Volume: 1.0 mL  
 Injection Volume: 1 uL

| Analyte                      | Result (ug/L) | Qualifier      | MDL   | RL   |
|------------------------------|---------------|----------------|-------|------|
| Acenaphthene                 | <0.93         | H              | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3          | H              | 1.3   | 9.3  |
| Acenaphthylene               | <0.93         | H              | 0.30  | 0.93 |
| Anthracene                   | <0.93         | H              | 0.30  | 0.93 |
| Benzidine                    | <37           | H*             | 19    | 37   |
| Benzoic acid                 | <19           | H*             | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19         | H              | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19         | H              | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23         | H              | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93         | H              | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19         | H              | 0.052 | 0.19 |
| Benzyl alcohol               | <19           | H              | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9          | H              | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9          | H              | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9          | H              | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3          | H              | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7          | H              | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9          | H              | 0.25  | 1.9  |
| Carbazole                    | <4.7          | H              | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3          | H              | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3          | H              | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9          | H              | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7          | H              | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7          | H              | 0.76  | 4.7  |
| Chrysene                     | <0.47         | H              | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28         | H              | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9          | H              | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7          | H              | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9          | H              | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9          | H              | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9          | H              | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7          | H              | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3          | H              | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9          | H              | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3          | H              | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9          | H              | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19           | H              | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19           | H <sup>^</sup> | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3          | H              | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47         | H              | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3          | H              | 2.3   | 9.3  |
| Fluoranthene                 | <0.93         | H              | 0.30  | 0.93 |
| Fluorene                     | <0.93         | H              | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7          | H              | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47         | H              | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7          | H              | 1.0   | 4.7  |

024/6/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: JP-M13-GWMWAEHA 14R

Lab Sample ID: 500-44555-2

Date Sampled: 03/01/2012 1200

Client Matrix: Water

Date Received: 03/01/2012 1505

## 8270C SVOC

|                                |                            |                                |
|--------------------------------|----------------------------|--------------------------------|
| Analysis Method: 8270C         | Analysis Batch: 500-143761 | Instrument ID: CMS23           |
| Prep Method: 3510C             | Prep Batch: 500-143645     | Lab File ID: 44555-2RE.d       |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 1070 mL |
| Analysis Date: 03/20/2012 1739 | Run Type: RE               | Final Weight/Volume: 1.0 mL    |
| Prep Date: 03/19/2012 1330     |                            | Injection Volume: 1 uL         |

| Analyte                   | Result (ug/L) | Qualifier | MDL   | RL   |
|---------------------------|---------------|-----------|-------|------|
| Hexachloroethane          | <4.7          | H         | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23         | H         | 0.079 | 0.23 |
| Isophorone                | <1.9          | H         | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47         | H         | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9          | H         | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9          | H         | 0.41  | 1.9  |
| Naphthalene               | <0.93         | H         | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7          | H*        | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3          | H         | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3          | H         | 3.7   | 9.3  |
| Nitrobenzene              | <0.93         | H         | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3          | H         | 2.0   | 9.3  |
| 4-Nitrophenol             | <19           | H*        | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93         | H         | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47         | H         | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3          | H         | 5.2   | 9.3  |
| Phenanthrene              | <0.93         | H         | 0.33  | 0.93 |
| Phenol                    | <4.7          | H         | 0.34  | 4.7  |
| Pyrene                    | <0.93         | H         | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9          | H         | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3          | H         | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7          | H         | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 33   |           | 20 - 110          |
| Phenol-d5            | 21   |           | 10 - 115          |
| Nitrobenzene-d5      | 62   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 64   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 67   |           | 40 - 125          |
| Terphenyl-d14        | 86   |           | 50 - 135          |

024/6/12

LDC #: 27391B2

**VALIDATION COMPLETENESS WORKSHEET**

Date: 4/5/12

SDG #: 500-44555-1

Level III

Page: 1 of 1

Laboratory: Test America, Inc.

Reviewer: BR

2nd Reviewer: ✓

**METHOD:** GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                                |    | Comments                 |
|-------|--|----|--------------------------|
| I.    | Technical holding times                        | SW | Sampling dates: 03/01/12 |
| II.   | GC/MS Instrument performance check             | A  |                          |
| III.  | Initial calibration                            | SW | RSD $\leq$ 30/152, r2    |
| IV.   | Continuing calibration/ICV                     | SW | ICV/CCV $\leq$ 202       |
| V.    | Blanks   | A  |                          |
| VI.   | Surrogate spikes                               | SW |                          |
| VII.  | Matrix spike/Matrix spike duplicates           | N  | Client spec.             |
| VIII. | Laboratory control samples                     | SW | LCS/D                    |
| IX.   | Regional Quality Assurance and Quality Control | N  |                          |
| X.    | Internal standards                             | SW |                          |
| XI.   | Target compound identification                 | N  |                          |
| XII.  | Compound quantitation/RL/LOQ/LODs              | N  |                          |
| XIII. | Tentatively identified compounds (TICs)        | N  |                          |
| XIV.  | System performance                             | N  |                          |
| XV.   | Overall assessment of data                     | A  |                          |
| XVI.  | Field duplicates                               | N  |                          |
| XVII. | Field blanks                                   | N  |                          |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples: water

|    |                       |    |               |    |  |    |  |
|----|-----------------------|----|---------------|----|--|----|--|
| 1  | JP-M13-GWMWAEHA 15    | 11 | 500-142158-MB | 21 |  | 31 |  |
| 2  | JP-M13-GWMWAEHA 14R   | 12 | 500-143645-MB | 22 |  | 32 |  |
| 3  | JP-M13-GWMWAEHA 14RRE | 13 |               | 23 |  | 33 |  |
| 4  |                       | 14 |               | 24 |  | 34 |  |
| 5  |                       | 15 |               | 25 |  | 35 |  |
| 6  |                       | 16 |               | 26 |  | 36 |  |
| 7  |                       | 17 |               | 27 |  | 37 |  |
| 8  |                       | 18 |               | 28 |  | 38 |  |
| 9  |                       | 19 |               | 29 |  | 39 |  |
| 10 |                       | 20 |               | 30 |  | 40 |  |

# VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

|                                       |                               |                                  |  |  |
|---------------------------------------|-------------------------------|----------------------------------|--|--|
| A. Phenol**                           | P. Bis(2-chloroethoxy)methane | EE. 2,6-Dinitrotoluene           | TT. Pentachlorophenol**                | <del>XX</del> . Benzo(a)pyrene**       |
| B. Bis (2-chloroethyl) ether          | Q. 2,4-Dichlorophenol**       | FF. 3-Nitroaniline               | UU. Phenanthrene                       | <del>XX</del> . Indeno(1,2,3-cd)pyrene |
| C. 2-Chlorophenol                     | R. 1,2,4-Trichlorobenzene     | GG. Acenaphthene**               | VV. Anthracene                         | <del>XX</del> . Dibenz(a,h)anthracene  |
| D. 1,3-Dichlorobenzene                | S. Naphthalene                | HH. 2,4-Dinitrophenol*           | WW. Carbazole                          | <del>XX</del> . Benzo(g,h,i)perylene   |
| E. 1,4-Dichlorobenzene**              | T. 4-Chloroaniline            | II. 4-Nitrophenol*               | XX. Di-n-butylphthalate                | MMM. Bis(2-Chloroisopropyl)ether       |
| F. 1,2-Dichlorobenzene                | U. Hexachlorobutadiene**      | JJ. Dibenzofuran                 | YY. Fluoranthene**                     | NNN. Aniline                           |
| G. 2-Methylphenol                     | V. 4-Chloro-3-methylphenol**  | KK. 2,4-Dinitrotoluene           | <del>ZZ</del> . Pyrene                 | OOO. N-Nitrosodimethylamine            |
| H. 2,2'-Oxybis(1-chloropropane)       | W. 2-Methylnaphthalene        | LL. Diethylphthalate             | AAA. Butylbenzylphthalate              | PPP. Benzoic Acid                      |
| <del>5-4-4</del><br>I. X-Methylphenol | X. Hexachlorocyclopentadiene* | MM. 4-Chlorophenyl-phenyl ether  | BBB. 3,3'-Dichlorobenzidine            | QQQ. Benzyl alcohol                    |
| J. N-Nitroso-di-n-propylamine*        | Y. 2,4,6-Trichlorophenol**    | NN. Fluorene                     | CCC. Benzo(a)anthracene                | RRR. Pyridine                          |
| K. Hexachloroethane                   | Z. 2,4,5-Trichlorophenol      | OO. 4-Nitroaniline               | DDD. Chrysene                          | <del>SSS</del> . Benzidine             |
| L. Nitrobenzene                       | AA. 2-Chloronaphthalene       | PP. 4,6-Dinitro-2-methylphenol   | EEE. Bis(2-ethylhexyl)phthalate        | TTT.                                   |
| M. Isophorone                         | BB. 2-Nitroaniline            | QQ. N-Nitrosodiphenylamine (1)** | <del>XXX</del> . Di-n-octylphthalate** | UUU                                    |
| N. 2-Nitrophenol**                    | CC. Dimethylphthalate         | RR. 4-Bromophenyl-phenylether    | <del>GGG</del> . Benzo(b)fluoranthene  | VVV.                                   |
| O. 2,4-Dimethylphenol                 | DD. Acenaphthylene            | SS. Hexachlorobenzene            | <del>HHH</del> . Benzo(k)fluoranthene  | WWW.                                   |

Notes: \* = System performance check compound (SPCC) for RRF; \*\* = Calibration check compound (CCC) for %RSD.

CRY = 0  
PRY = X

All circled dates have exceeded the technical holding times.

(Y) N N/A Were all cooler temperatures within validation criteria?

[illegible]

## TECHNICAL HOLDING TIME CRITERIA

Water: Extracted within 7 days, analyzed within 40 days.  
Soil: Extracted within 14 days, analyzed within 40 days.





| * QC limits are advisory    | QC Limits (Soil) | QC Limits (Water)                 |
|-----------------------------|------------------|-----------------------------------|
| S1 (NBZ) = Nitrobenzene-d5  | 23-120           |                                   |
| S2 (FBP) = 2-Fluorobiphenyl | 30-115           |                                   |
| S3 (TPH) = Terphenyl-d14    | 18-137           |                                   |
| S4 (PHL) = Phenol-d5        | 24-113           |                                   |
|                             |                  | S5 (2FP) = 2-Fluorophenol         |
|                             |                  | S6 (TBP) = 2,4,6-Tribromophenol   |
|                             |                  | S7 (2CP) = 2-Chlorophenol-d4      |
|                             |                  | S8 (DCB) = 1,2-Dichlorobenzene-d4 |
|                             |                  |                                   |
|                             | 25-121           | 21-100                            |
|                             | 19-122           | 10-123                            |
|                             | 20-130*          | 33-110*                           |
|                             | 20-130*          | 16-110*                           |





**Laboratory Data Consultants, Inc.**  
**Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** March 1, 2012  
**LDC Report Date:** April 5, 2012  
**Matrix:** Water  
**Parameters:** Dissolved Metals  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-44555-1

**Sample Identification**

JP-M13-GWMWAEHA 15  
JP-M13-GWMWAEHA 14R  
JP-M13-GWMWAEHA 14RMS  
JP-M13-GWMWAEHA 14RMSD  
JP-M13-GWMWAEHA 14RDUP

## Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B and 7470A for Dissolved Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## **I. Technical Holding Times**

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## **II. ICPMS Tune**

ICP-MS was not utilized in this SDG.

## **III. Calibration**

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No dissolved metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

## **V. ICP Interference Check Sample (ICS) Analysis**

The frequency of analysis was met.

The criteria for analysis were met.

## **VI. Matrix Spike/(Matrix Spike) Duplicates**

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## **VII. Duplicate Sample Analysis**

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

## **VIII. Laboratory Control Samples (LCS)**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

#### **IX. Internal Standards (ICP-MS)**

ICP-MS was not utilized in this SDG.

#### **X. Furnace Atomic Absorption QC**

Graphite furnace atomic absorption was not utilized in this SDG.

#### **XI. ICP Serial Dilution**

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

#### **XII. Sample Result Verification**

Raw data were not reviewed for this SDG.

#### **XIII. Overall Assessment of Data**

Data flags are summarized at the end of this report if data has been qualified.

#### **XIV. Field Duplicates**

No field duplicates were identified in this SDG.

**JOAAP-GW**

**Dissolved Metals - Data Qualification Summary - SDG 500-44555-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 500-44555-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Dissolved Metals - Field Blank Data Qualification Summary - SDG 500-44555-1**

No Sample Data Qualified in this SDG

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: JP-M13-GWMWAEHA 15

Lab Sample ID: 500-44555-1

Date Sampled: 03/01/2012 0900

Client Matrix: Water

Date Received: 03/01/2012 1505

## 6010B Metals (ICP)-Dissolved

|                                |                            |                              |
|--------------------------------|----------------------------|------------------------------|
| Analysis Method: 6010B         | Analysis Batch: 500-142619 | Instrument ID: ICP5          |
| Prep Method: 3010A             | Prep Batch: 500-142171     | Lab File ID: P50307B         |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 50 mL |
| Analysis Date: 03/07/2012 1941 |                            | Final Weight/Volume: 50 mL   |
| Prep Date: 03/02/2012 0800     |                            |                              |

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | 5.7           |           | 0.025   | 0.20   |
| Antimony  | <0.020        |           | 0.0026  | 0.020  |
| Arsenic   | 0.0076        | J         | 0.0024  | 0.010  |
| Barium    | 0.10          |           | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | <0.0020       |           | 0.00054 | 0.0020 |
| Calcium   | 140           |           | 0.087   | 0.20   |
| Chromium  | 0.0088        | J         | 0.00096 | 0.010  |
| Cobalt    | 0.0066        |           | 0.0010  | 0.0050 |
| Copper    | 0.013         |           | 0.0011  | 0.010  |
| Iron      | 15            |           | 0.070   | 0.20   |
| Lead      | 0.012         |           | 0.0016  | 0.0050 |
| Magnesium | 77            |           | 0.024   | 0.10   |
| Manganese | 0.54          |           | 0.0011  | 0.010  |
| Nickel    | 0.013         |           | 0.0019  | 0.010  |
| Potassium | 4.6           |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Sodium    | 20            |           | 0.12    | 1.0    |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | 0.014         |           | 0.00062 | 0.0050 |
| Zinc      | 0.029         |           | 0.0047  | 0.020  |

## 7470A Mercury (CVAA)-Dissolved

|                                |                            |                              |
|--------------------------------|----------------------------|------------------------------|
| Analysis Method: 7470A         | Analysis Batch: 500-142537 | Instrument ID: HG6           |
| Prep Method: 7470A             | Prep Batch: 500-142429     | Lab File ID: 030712R.CSV     |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 25 mL |
| Analysis Date: 03/07/2012 0908 |                            | Final Weight/Volume: 25 mL   |
| Prep Date: 03/06/2012 1415     |                            |                              |

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         |           | 0.070 | 0.20 |

024/6/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: JP-M13-GWMWAEHA 14R

Lab Sample ID: 500-44555-2

Date Sampled: 03/01/2012 1200

Client Matrix: Water

Date Received: 03/01/2012 1505

## 6010B Metals (ICP)-Dissolved

|                                |                            |                              |
|--------------------------------|----------------------------|------------------------------|
| Analysis Method: 6010B         | Analysis Batch: 500-142619 | Instrument ID: ICP5          |
| Prep Method: 3010A             | Prep Batch: 500-142171     | Lab File ID: P50307B         |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 50 mL |
| Analysis Date: 03/07/2012 1947 |                            | Final Weight/Volume: 50 mL   |
| Prep Date: 03/02/2012 0800     |                            |                              |

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | 0.027         | J         | 0.025   | 0.20   |
| Antimony  | <0.020        |           | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.089         |           | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | <0.0020       |           | 0.00054 | 0.0020 |
| Calcium   | 110           |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | 0.0012        | J         | 0.0011  | 0.010  |
| Iron      | <0.20         |           | 0.070   | 0.20   |
| Lead      | <0.0050       |           | 0.0016  | 0.0050 |
| Magnesium | 50            |           | 0.024   | 0.10   |
| Manganese | 0.0019        | J         | 0.0011  | 0.010  |
| Nickel    | <0.010        |           | 0.0019  | 0.010  |
| Potassium | 12            |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | 0.0029        | J         | 0.00062 | 0.0050 |
| Zinc      | <0.020        |           | 0.0047  | 0.020  |

|                                |                            |                              |
|--------------------------------|----------------------------|------------------------------|
| Analysis Method: 6010B         | Analysis Batch: 500-142761 | Instrument ID: ICP5          |
| Prep Method: 3010A             | Prep Batch: 500-142171     | Lab File ID: P50308C         |
| Dilution: 5.0                  |                            | Initial Weight/Volume: 50 mL |
| Analysis Date: 03/09/2012 0344 |                            | Final Weight/Volume: 50 mL   |
| Prep Date: 03/02/2012 0800     |                            |                              |

| Analyte | Result (mg/L) | Qualifier | MDL  | RL  |
|---------|---------------|-----------|------|-----|
| Sodium  | 50            |           | 0.60 | 5.0 |

## 7470A Mercury (CVAA)-Dissolved

|                                |                            |                              |
|--------------------------------|----------------------------|------------------------------|
| Analysis Method: 7470A         | Analysis Batch: 500-142537 | Instrument ID: HG6           |
| Prep Method: 7470A             | Prep Batch: 500-142429     | Lab File ID: 030712R.CSV     |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 25 mL |
| Analysis Date: 03/07/2012 0910 |                            | Final Weight/Volume: 25 mL   |
| Prep Date: 03/06/2012 1415     |                            |                              |

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         |           | 0.070 | 0.20 |

024/6/12

LDC #: 27391B4

**VALIDATION COMPLETENESS WORKSHEET**

Date: 4-5-12

SDG #: 500-44555-1

Level III

Page: 1 of 1

Laboratory: Test America, Inc.

Reviewer: MG

2nd Reviewer: W**METHOD:** Dissolved Metals (EPA SW 846 Method 6010B/7000) *7470A*

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                              |   | Comments               |
|-------|--|---|------------------------|
| I.    | Technical holding times                      | A | Sampling dates: 3-1-12 |
| II.   | ICP/MS Tune                                  | N | not utilized           |
| III.  | Calibration                                  | A |                        |
| IV.   | Blanks                                       | A |                        |
| V.    | ICP Interference Check Sample (ICS) Analysis | A |                        |
| VI.   | Matrix Spike Analysis                        | A | MS/MSD                 |
| VII.  | Duplicate Sample Analysis                    | A | DUP                    |
| VIII. | Laboratory Control Samples (LCS)             | A | LCS                    |
| IX.   | Internal Standard (ICP-MS)                   | N | not utilized           |
| X.    | Furnace Atomic Absorption QC                 | N | " "                    |
| XI.   | ICP Serial Dilution                          | A |                        |
| XII.  | Sample Result Verification                   | N |                        |
| XIII. | Overall Assessment of Data                   | A |                        |
| XIV.  | Field Duplicates                             | N |                        |
| XV.   | Field Blanks                                 | N |                        |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

*all water*

|    |                        |    |     |    |  |    |  |
|----|------------------------|----|-----|----|--|----|--|
| 1  | JP-M13-GWMWAEHA 15     | 11 |     | 21 |  | 31 |  |
| 2  | JP-M13-GWMWAEHA 14R    | 12 |     | 22 |  | 32 |  |
| 3  | JP-M13-GWMWAEHA 14RMS  | 13 |     | 23 |  | 33 |  |
| 4  | JP-M13-GWMWAEHA 14RMSD | 14 |     | 24 |  | 34 |  |
| 5  | JP-M13-GWMWAEHA 14RDUP | 15 |     | 25 |  | 35 |  |
| 6  |                        | 16 |     | 26 |  | 36 |  |
| 7  |                        | 17 |     | 27 |  | 37 |  |
| 8  |                        | 18 |     | 28 |  | 38 |  |
| 9  |                        | 19 |     | 29 |  | 39 |  |
| 10 |                        | 20 | PBW | 30 |  | 40 |  |

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_


LDC #: 27391B4

## VALIDATION FINDINGS WORKSHEET

### Sample Specific Element Reference

Page: 1 of 1

Reviewer: MG

2nd reviewer: 

All circled elements are applicable to each sample.

[illegible]

Comments: Mercury by CVAA if performed

**Laboratory Data Consultants, Inc.**  
**Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** March 1, 2012  
**LDC Report Date:** April 5, 2012  
**Matrix:** Water  
**Parameters:** Wet Chemistry  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-44555-1

**Sample Identification**

JP-M13-GWMWAEHA 15  
JP-M13-GWMWAEHA 14R

## Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.0 for Dissolved Nitrate as Nitrogen and Dissolved Sulfate.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## **I. Technical Holding Times**

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## **II. Initial Calibration**

All criteria for the initial calibration were met.

## **III. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

## **V. Matrix Spike/Matrix Spike Duplicates**

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## **VI. Duplicates**

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

## **VII. Laboratory Control Samples**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## **VIII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **IX. Overall Assessment of Data**

Data flags are summarized at the end of this report if data has been qualified.

## **X. Field Duplicates**

No field duplicates were identified in this SDG.

**JOAAP-GW**

**Wet Chemistry - Data Qualification Summary - SDG 500-44555-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 500-44555-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Wet Chemistry - Field Blank Data Qualification Summary - SDG 500-44555-1**

No Sample Data Qualified in this SDG

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

---

### General Chemistry

Client Sample ID: JP-M13-GWMWAEHA 15

Lab Sample ID: 500-44555-1

Date Sampled: 03/01/2012 0900

Client Matrix: Water

Date Received: 03/01/2012 1505

| Analyte   | Result | Qual | Units | MDL   | RL   | Dil | Method |
|---|--------|------|-------|-------|------|-----|--------|
| Nitrate as N-Dissolved                                    | 0.13   |      | mg/L  | 0.023 | 0.10 | 1.0 | 300.0  |
| Analysis Batch: 500-142165 Analysis Date: 03/01/2012 1812 |        |      |       |       |      |     |        |
| Sulfate-Dissolved   | 12     |      | mg/L  | 0.90  | 2.0  | 10  | 300.0  |
| Analysis Batch: 500-142165 Analysis Date: 03/01/2012 1826 |        |      |       |       |      |     |        |

024/6/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

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### General Chemistry

Client Sample ID: JP-M13-GWMWAEHA 14R

Lab Sample ID: 500-44555-2

Date Sampled: 03/01/2012 1200

Client Matrix: Water

Date Received: 03/01/2012 1505


| Analyte   | Result | Qual | Units | MDL   | RL   | Dil | Method |
|---|--------|------|-------|-------|------|-----|--------|
| Nitrate as N-Dissolved                                    | 1.7    |      | mg/L  | 0.023 | 0.10 | 1.0 | 300.0  |
| Analysis Batch: 500-142165 Analysis Date: 03/01/2012 1841 |        |      |       |       |      |     |        |
| Sulfate-Dissolved   | 140    |      | mg/L  | 1.8   | 4.0  | 20  | 300.0  |
| Analysis Batch: 500-143904 Analysis Date: 03/20/2012 2005 |        |      |       |       |      |     |        |

024/6/12

LDC #: 27391B6  
 SDG #: 500-44555-1  
 Laboratory: Test America, Inc.

# VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 4-5-12  
 Page: 1 of 1  
 Reviewer: MG  
 2nd Reviewer: 

**METHOD:** Dissolved Nitrate-N, Dissolved Sulfate (EPA Method 300.0)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                      |   | Comments               |
|-------|--------------------------------------|---|------------------------|
| I.    | Technical holding times              | A | Sampling dates: 3-1-12 |
| II.   | Initial calibration                  | A |                        |
| III.  | Calibration verification             | A |                        |
| IV.   | Blanks                               | A |                        |
| V.    | Matrix Spike/Matrix Spike Duplicates | N | client specified       |
| VI.   | Duplicates                           | N | " "                    |
| VII.  | Laboratory control samples           | A | LCS                    |
| VIII. | Sample result verification           | N |                        |
| IX.   | Overall assessment of data           | A |                        |
| X.    | Field duplicates                     | N |                        |
| XI.   | Field blanks                         | N |                        |

Note: A = Acceptable  
 N = Not provided/applicable  
 SW = See worksheet

ND = No compounds detected  
 R = Rinsate  
 FB = Field blank

D = Duplicate  
 TB = Trip blank  
 EB = Equipment blank

Validated Samples:  
 all water

|    |                     |    |       |    |  |    |  |
|----|---------------------|----|-------|----|--|----|--|
| 1  | JP-M13-GWMWAEHA 15  | 11 |       | 21 |  | 31 |  |
| 2  | JP-M13-GWMWAEHA 14R | 12 |       | 22 |  | 32 |  |
| 3  |                     | 13 |       | 23 |  | 33 |  |
| 4  |                     | 14 |       | 24 |  | 34 |  |
| 5  |                     | 15 |       | 25 |  | 35 |  |
| 6  |                     | 16 |       | 26 |  | 36 |  |
| 7  |                     | 17 |       | 27 |  | 37 |  |
| 8  |                     | 18 |       | 28 |  | 38 |  |
| 9  |                     | 19 | PBW 1 | 29 |  | 39 |  |
| 10 |                     | 20 | PBW 2 | 30 |  | 40 |  |

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

LDC #: 27391B6

## VALIDATION FINDINGS WORKSHEET

### Sample Specific Analysis Reference

Page: 1 of 1

Reviewer: MG

2nd reviewer: W

All circled methods are applicable to each sample.

[illegible]

Comments: \_\_\_\_\_

**Laboratory Data Consultants, Inc.**  
**Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** March 1, 2012  
**LDC Report Date:** April 5, 2012  
**Matrix:** Water  
**Parameters:** Explosives  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-44555-1

**Sample Identification**

JP-M13-GWMWAEHA 15  
JP-M13-GWMWAEHA 14R

## Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330 for Explosives.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## **I. Technical Holding Times**

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## **II. Initial Calibration**

Initial calibration of compounds was performed for the primary (quantitation) column and confirmation column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

## **III. Continuing Calibration**

Continuing calibration was performed at the required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No explosive contaminants were found in the method blanks.

No field blanks were identified in this SDG.

## **V. Surrogate Recovery**

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## **VI. Matrix Spike/Matrix Spike Duplicates**

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## **VII. Laboratory Control Samples**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### **VIII. Target Compound Identification**

Raw data were not reviewed for this SDG.

### **IX. Compound Quantitation and RLs**

Raw data were not reviewed for this SDG.

### **X. System Performance**

Raw data were not reviewed for this SDG.

### **XI. Overall Assessment of Data**

Data flags are summarized at the end of this report if data has been qualified.

### **XII. Field Duplicates**

No field duplicates were identified in this SDG.

**JOAAP-GW**

**Explosives - Data Qualification Summary - SDG 500-44555-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Explosives - Laboratory Blank Data Qualification Summary - SDG 500-44555-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Explosives - Field Blank Data Qualification Summary - SDG 500-44555-1**

No Sample Data Qualified in this SDG

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: JP-M13-GWMWAEHA 15

Lab Sample ID: 500-44555-1

Date Sampled: 03/01/2012 0900

Client Matrix: Water

Date Received: 03/01/2012 1505

## 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-142553 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-142545 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 03/08/2012 0221 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 03/07/2012 0840 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 103  |           | 70 - 130          |

024/6/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-44555-1

Client Sample ID: JP-M13-GWMWAEHA 14R

Lab Sample ID: 500-44555-2

Date Sampled: 03/01/2012 1200

Client Matrix: Water

Date Received: 03/01/2012 1505

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-142553 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-142545     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 03/08/2012 0313 |                            | Injection Volume: 100 uL      |
| Prep Date: 03/07/2012 0840     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL               | RL   |
|----------------------------|---------------|-----------|-------------------|------|
| HMX                        | <0.31         |           | 0.12              | 0.31 |
| RDX                        | <0.16         |           | 0.077             | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039             | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033             | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032             | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036             | 0.16 |
| Tetryl                     | <0.39         |           | 0.065             | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032             | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071             | 0.31 |
| 2-Amino-4,6-dinitrotoluene | 0.79          |           | 0.035             | 0.31 |
| 4-Amino-2,6-dinitrotoluene | 1.1           |           | 0.074             | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082             | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082             | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14              | 0.31 |
| Surrogate                  | %Rec          | Qualifier | Acceptance Limits |      |
| 1,2-Dinitrobenzene         | 107           |           | 70 - 130          |      |

024/6/12

LDC #: 27391B40

**VALIDATION COMPLETENESS WORKSHEET**

SDG #: 500-44555-1

Level III

Laboratory: Test America, Inc.

Date: 4/03/12

Page: 1 of 1

Reviewer: At2nd Reviewer: JVG**METHOD:** HPLC Explosives (EPA SW 846 Method 8330)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                      |                                      | Comments                |
|-------|--------------------------------------|--------------------------------------|-------------------------|
| I.    | Technical holding times              | A                                    | Sampling dates: 3/01/12 |
| II.   | Initial calibration                  | A                                    | % RSD $\leq$ 20%.       |
| III.  | Calibration verification/ICV         | A                                    | % D $\leq$ 15%.         |
| IV.   | Blanks                               | A                                    |                         |
| V.    | Surrogate recovery                   | A                                    |                         |
| VI.   | Matrix spike/Matrix spike duplicates | N                                    |                         |
| VII.  | Laboratory control samples           | A <del>ASW</del> <sup>#4/04/12</sup> | LCS ONLY                |
| VIII. | Target compound identification       | N                                    |                         |
| IX.   | Compound quantitation/RL/LOQ/LODs    | N                                    |                         |
| X.    | System Performance                   | N                                    |                         |
| XI.   | Overall assessment of data           | A                                    |                         |
| XII.  | Field duplicates                     | N                                    |                         |
| XIII. | Field blanks                         | N                                    |                         |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

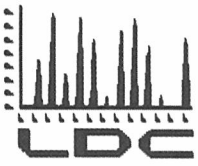
D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples: WATER

|    |                     |    |           |    |  |    |  |
|----|---------------------|----|-----------|----|--|----|--|
| 1  | JP-M13-GWMWAEHA 15  | 11 | 142545 MB | 21 |  | 31 |  |
| 2  | JP-M13-GWMWAEHA 14R | 12 |           | 22 |  | 32 |  |
| 3  |                     | 13 |           | 23 |  | 33 |  |
| 4  |                     | 14 |           | 24 |  | 34 |  |
| 5  |                     | 15 |           | 25 |  | 35 |  |
| 6  |                     | 16 |           | 26 |  | 36 |  |
| 7  |                     | 17 |           | 27 |  | 37 |  |
| 8  |                     | 18 |           | 28 |  | 38 |  |
| 9  |                     | 19 |           | 29 |  | 39 |  |
| 10 |                     | 20 |           | 30 |  | 40 |  |

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**LDC Validation Report #27595**  
**(April 2012 Samples)**



## Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437

Web [www.lab-data.com](http://www.lab-data.com)

Fax 760.634.0439

Toltest.  
5201 Jewell Lane  
Poducah KY 42001  
ATTN: Mr. Gary Reside

May 23, 2012

SUBJECT: JOAAP-GW, Data Validation

Dear Mr. Reside,

Enclosed is the final validation report for the fractions listed below. This SDG was received on May 7, 2012. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 27595:**

| <b><u>SDG #</u></b> | <b><u>Fraction</u></b>       |
|---------------------|------------------------------|
| 500-45420-1         | Dissolved Metals, Explosives |

The data validation was performed under EPA Level III guidelines. The analyses were validated using the following documents, as applicable to each method:

- Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan(QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. Rev. 0 July 2009
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1, April 2009
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink  
Project Manager/Chemist

**LDC #27595 (Toltest-Poducah,KY / JOAAP-GW)**

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

**Laboratory Data Consultants, Inc.**  
**Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 10 through April 11, 2012  
**LDC Report Date:** May 16, 2012  
**Matrix:** Water  
**Parameters:** Dissolved Metals  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-45420-1

**Sample Identification**

JP-L3-SW557-0412  
JP-L3-SW558-0412  
JP-L3-GWMW631-0412  
JP-L3-GWMW630-0412  
JP-L3-GWMW999-0412  
JP-L3-GWMW412-0412  
JP-L3-GWMW633-0412  
JP-L3-SW777-0412

## Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B and 7470A for Dissolved Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. ICPMS Tune

ICP-MS was not utilized in this SDG.

## III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No dissolved metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

| Method Blank ID | Analyte | Maximum Concentration | Associated Samples             |
|-----------------|---------|-----------------------|--------------------------------|
| PB (prep blank) | Copper  | 0.00549 mg/L          | All samples in SDG 500-45420-1 |

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

| Sample             | Analyte | Reported Concentration | Modified Final Concentration |
|--------------------|---------|------------------------|------------------------------|
| JP-L3-SW557-0412   | Copper  | 0.023 mg/L             | 0.023U mg/L                  |
| JP-L3-SW558-0412   | Copper  | 0.0066 mg/L            | 0.0066U mg/L                 |
| JP-L3-GWMW631-0412 | Copper  | 0.015 mg/L             | 0.015U mg/L                  |
| JP-L3-GWMW630-0412 | Copper  | 0.027 mg/L             | 0.027U mg/L                  |
| JP-L3-GWMW999-0412 | Copper  | 0.020 mg/L             | 0.020U mg/L                  |

| Sample             | Analyte | Reported Concentration | Modified Final Concentration |
|--------------------|---------|------------------------|------------------------------|
| JP-L3-GWMW412-0412 | Copper  | 0.026 mg/L             | 0.026U mg/L                  |
| JP-L3-GWMW633-0412 | Copper  | 0.023 mg/L             | 0.023U mg/L                  |
| JP-L3-SW777-0412   | Copper  | 0.0041 mg/L            | 0.0041U mg/L                 |

No field blanks were identified in this SDG.

#### **V. ICP Interference Check Sample (ICS) Analysis**

The frequency of analysis was met.

The criteria for analysis were met.

#### **VI. Matrix Spike/(Matrix Spike) Duplicates**

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

#### **VII. Duplicate Sample Analysis**

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

#### **VIII. Laboratory Control Samples (LCS)**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

#### **IX. Internal Standards (ICP-MS)**

ICP-MS was not utilized in this SDG.

#### **X. Furnace Atomic Absorption QC**

Graphite furnace atomic absorption was not utilized in this SDG.

#### **XI. ICP Serial Dilution**

ICP serial dilution analysis was not performed by the laboratory.

## XII. Sample Result Verification

Raw data were not reviewed for this SDG.

## XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIV. Field Duplicates

Samples JP-L3-GWMW630-0412 and JP-L3-GWMW999-0412 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

| Analyte   | Concentration (mg/L) |                    | RPD<br>(Limits) | Difference<br>(Limits)   | Flags | A or P |
|-----------|----------------------|--------------------|-----------------|--------------------------|-------|--------|
|           | JP-L3-GWMW630-0412   | JP-L3-GWMW999-0412 |                 |                          |       |        |
| Barium    | 0.011                | 0.011              | -               | 0 ( $\leq 0.020$ )       | -     | -      |
| Cadmium   | 0.00078              | 0.00087            | -               | 0.00009 ( $\leq 0.040$ ) | -     | -      |
| Calcium   | 83                   | 84                 | 1 ( $\leq 25$ ) | -                        | -     | -      |
| Copper    | 0.027                | 0.020              | -               | 0.007 ( $\leq 0.020$ )   | -     | -      |
| Magnesium | 43                   | 44                 | 2 ( $\leq 25$ ) | -                        | -     | -      |
| Manganese | 0.033                | 0.032              | -               | 0.001 ( $\leq 0.020$ )   | -     | -      |
| Potassium | 4.4                  | 4.4                | 0 ( $\leq 25$ ) | -                        | -     | -      |
| Sodium    | 22                   | 22                 | 0 ( $\leq 25$ ) | -                        | -     | -      |
| Zinc      | 0.0087               | 0.020U             | -               | 0.0113 ( $\leq 0.040$ )  | -     | -      |

**JOAAP-GW****Dissolved Metals - Data Qualification Summary - SDG 500-45420-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 500-45420-1**

| SDG         | Sample             | Analyte | Modified Final Concentration | A or P |
|-------------|--------------------|---------|------------------------------|--------|
| 500-45420-1 | JP-L3-SW557-0412   | Copper  | 0.023U mg/L                  | A      |
| 500-45420-1 | JP-L3-SW558-0412   | Copper  | 0.0066U mg/L                 | A      |
| 500-45420-1 | JP-L3-GWMW631-0412 | Copper  | 0.015U mg/L                  | A      |
| 500-45420-1 | JP-L3-GWMW630-0412 | Copper  | 0.027U mg/L                  | A      |
| 500-45420-1 | JP-L3-GWMW999-0412 | Copper  | 0.020U mg/L                  | A      |
| 500-45420-1 | JP-L3-GWMW412-0412 | Copper  | 0.026U mg/L                  | A      |
| 500-45420-1 | JP-L3-GWMW633-0412 | Copper  | 0.023U mg/L                  | A      |
| 500-45420-1 | JP-L3-SW777-0412   | Copper  | 0.0041U mg/L                 | A      |

**JOAAP-GW****Dissolved Metals - Field Blank Data Qualification Summary - SDG 500-45420-1**

No Sample Data Qualified in this SDG

1A-IN  
INORGANIC ANALYSIS DATA SHEET  
METALS - DISSOLVED

Client Sample ID: JP-L3-SW557-0412

Lab Sample ID: 500-45420-1

Lab Name: TestAmerica Chicago

Job No.: 500-45420-1

SDG ID.:

Matrix: Water

Date Sampled: 04/10/2012 16:40

Reporting Basis: WET

Date Received: 04/12/2012 09:00

| CAS No.   | Analyte   | Result  | RL     | MDL     | Units | C | Q | DIL | Method |
|-----------|-----------|---------|--------|---------|-------|---|---|-----|--------|
| 7429-90-5 | Aluminum  | <0.20   | 0.20   | 0.025   | mg/L  |   |   | 1   | 6010B  |
| 7440-36-0 | Antimony  | <0.020  | 0.020  | 0.0026  | mg/L  |   |   | 1   | 6010B  |
| 7440-38-2 | Arsenic   | <0.010  | 0.010  | 0.0024  | mg/L  |   |   | 1   | 6010B  |
| 7440-39-3 | Barium    | 0.039   | 0.010  | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-41-7 | Beryllium | <0.0040 | 0.0040 | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-43-9 | Cadmium   | 0.00085 | 0.0020 | 0.00054 | mg/L  | J |   | 1   | 6010B  |
| 7440-70-2 | Calcium   | 75      | 0.20   | 0.087   | mg/L  |   |   | 1   | 6010B  |
| 7440-47-3 | Chromium  | <0.010  | 0.010  | 0.00096 | mg/L  |   |   | 1   | 6010B  |
| 7440-48-4 | Cobalt    | <0.0050 | 0.0050 | 0.0010  | mg/L  |   |   | 1   | 6010B  |
| 7440-50-8 | Copper    | 0.023   | 0.010  | 0.0011  | mg/L  |   | B | 1   | 6010B  |
| 7439-89-6 | Iron      | <0.20   | 0.20   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7439-92-1 | Lead      | <0.0050 | 0.0050 | 0.0016  | mg/L  |   |   | 1   | 6010B  |
| 7439-95-4 | Magnesium | 39      | 0.10   | 0.024   | mg/L  |   |   | 1   | 6010B  |
| 7439-96-5 | Manganese | 0.072   | 0.010  | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-02-0 | Nickel    | <0.010  | 0.010  | 0.0019  | mg/L  |   |   | 1   | 6010B  |
| 7440-09-7 | Potassium | 1.4     | 0.50   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7782-49-2 | Selenium  | <0.010  | 0.010  | 0.0027  | mg/L  |   |   | 1   | 6010B  |
| 7440-22-4 | Silver    | <0.0050 | 0.0050 | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-23-5 | Sodium    | 15      | 1.0    | 0.12    | mg/L  |   |   | 1   | 6010B  |
| 7440-28-0 | Thallium  | <0.010  | 0.010  | 0.0013  | mg/L  |   |   | 1   | 6010B  |
| 7440-62-2 | Vanadium  | <0.0050 | 0.0050 | 0.00062 | mg/L  |   |   | 1   | 6010B  |
| 7440-66-6 | Zinc      | <0.020  | 0.020  | 0.0047  | mg/L  |   |   | 1   | 6010B  |
| 7439-97-6 | Mercury   | <0.20   | 0.20   | 0.070   | ug/L  |   |   | 1   | 7470A  |

025/21/12

1A-IN  
INORGANIC ANALYSIS DATA SHEET  
METALS - DISSOLVED

Client Sample ID: JP-L3-SW558-0412

Lab Sample ID: 500-45420-2

Lab Name: TestAmerica Chicago

Job No.: 500-45420-1

SDG ID.:

Matrix: Water

Date Sampled: 04/10/2012 16:20

Reporting Basis: WET

Date Received: 04/12/2012 09:00

| CAS No.   | Analyte   | Result  | RL     | MDL     | Units | C | Q | DIL | Method |
|-----------|-----------|---------|--------|---------|-------|---|---|-----|--------|
| 7429-90-5 | Aluminum  | <0.20   | 0.20   | 0.025   | mg/L  |   |   | 1   | 6010B  |
| 7440-36-0 | Antimony  | <0.020  | 0.020  | 0.0026  | mg/L  |   |   | 1   | 6010B  |
| 7440-38-2 | Arsenic   | <0.010  | 0.010  | 0.0024  | mg/L  |   |   | 1   | 6010B  |
| 7440-39-3 | Barium    | 0.042   | 0.010  | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-41-7 | Beryllium | <0.0040 | 0.0040 | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-43-9 | Cadmium   | 0.00079 | 0.0020 | 0.00054 | mg/L  | J |   | 1   | 6010B  |
| 7440-70-2 | Calcium   | 80      | 0.20   | 0.087   | mg/L  |   |   | 1   | 6010B  |
| 7440-47-3 | Chromium  | <0.010  | 0.010  | 0.00096 | mg/L  |   |   | 1   | 6010B  |
| 7440-48-4 | Cobalt    | <0.0050 | 0.0050 | 0.0010  | mg/L  |   |   | 1   | 6010B  |
| 7440-50-8 | Copper    | 0.0066  | 0.010  | 0.0011  | mg/L  | J | B | 1   | 6010B  |
| 7439-89-6 | Iron      | <0.20   | 0.20   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7439-92-1 | Lead      | <0.0050 | 0.0050 | 0.0016  | mg/L  |   |   | 1   | 6010B  |
| 7439-95-4 | Magnesium | 43      | 0.10   | 0.024   | mg/L  |   |   | 1   | 6010B  |
| 7439-96-5 | Manganese | 0.0027  | 0.010  | 0.0011  | mg/L  | J |   | 1   | 6010B  |
| 7440-02-0 | Nickel    | <0.010  | 0.010  | 0.0019  | mg/L  |   |   | 1   | 6010B  |
| 7440-09-7 | Potassium | 1.0     | 0.50   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7782-49-2 | Selenium  | <0.010  | 0.010  | 0.0027  | mg/L  |   |   | 1   | 6010B  |
| 7440-22-4 | Silver    | <0.0050 | 0.0050 | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-23-5 | Sodium    | 6.2     | 1.0    | 0.12    | mg/L  |   |   | 1   | 6010B  |
| 7440-28-0 | Thallium  | <0.010  | 0.010  | 0.0013  | mg/L  |   |   | 1   | 6010B  |
| 7440-62-2 | Vanadium  | <0.0050 | 0.0050 | 0.00062 | mg/L  |   |   | 1   | 6010B  |
| 7440-66-6 | Zinc      | <0.020  | 0.020  | 0.0047  | mg/L  |   |   | 1   | 6010B  |
| 7439-97-6 | Mercury   | <0.20   | 0.20   | 0.070   | ug/L  |   |   | 1   | 7470A  |

*025/21/12*

1A-IN  
INORGANIC ANALYSIS DATA SHEET  
METALS - DISSOLVED

Client Sample ID: JP-L3-GMMW631-0412

Lab Sample ID: 500-45420-3

Lab Name: TestAmerica Chicago

Job No.: 500-45420-1

SDG ID.:

Matrix: Water

Date Sampled: 04/11/2012 09:40

Reporting Basis: WET

Date Received: 04/12/2012 09:00

| CAS No.   | Analyte   | Result  | RL     | MDL     | Units | C | Q | DIL | Method |
|-----------|-----------|---------|--------|---------|-------|---|---|-----|--------|
| 7429-90-5 | Aluminum  | <0.20   | 0.20   | 0.025   | mg/L  |   |   | 1   | 6010B  |
| 7440-36-0 | Antimony  | <0.020  | 0.020  | 0.0026  | mg/L  |   |   | 1   | 6010B  |
| 7440-38-2 | Arsenic   | <0.010  | 0.010  | 0.0024  | mg/L  |   |   | 1   | 6010B  |
| 7440-39-3 | Barium    | 0.017   | 0.010  | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-41-7 | Beryllium | <0.0040 | 0.0040 | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-43-9 | Cadmium   | 0.00082 | 0.0020 | 0.00054 | mg/L  | J |   | 1   | 6010B  |
| 7440-70-2 | Calcium   | 67      | 0.20   | 0.087   | mg/L  |   |   | 1   | 6010B  |
| 7440-47-3 | Chromium  | <0.010  | 0.010  | 0.00096 | mg/L  |   |   | 1   | 6010B  |
| 7440-48-4 | Cobalt    | <0.0050 | 0.0050 | 0.0010  | mg/L  |   |   | 1   | 6010B  |
| 7440-50-8 | Copper    | 0.015   | 0.010  | 0.0011  | mg/L  |   | B | 1   | 6010B  |
| 7439-89-6 | Iron      | <0.20   | 0.20   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7439-92-1 | Lead      | <0.0050 | 0.0050 | 0.0016  | mg/L  |   |   | 1   | 6010B  |
| 7439-95-4 | Magnesium | 36      | 0.10   | 0.024   | mg/L  |   |   | 1   | 6010B  |
| 7439-96-5 | Manganese | 0.022   | 0.010  | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-02-0 | Nickel    | <0.010  | 0.010  | 0.0019  | mg/L  |   |   | 1   | 6010B  |
| 7440-09-7 | Potassium | 4.9     | 0.50   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7782-49-2 | Selenium  | <0.010  | 0.010  | 0.0027  | mg/L  |   |   | 1   | 6010B  |
| 7440-22-4 | Silver    | <0.0050 | 0.0050 | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-23-5 | Sodium    | 28      | 1.0    | 0.12    | mg/L  |   |   | 1   | 6010B  |
| 7440-28-0 | Thallium  | <0.010  | 0.010  | 0.0013  | mg/L  |   |   | 1   | 6010B  |
| 7440-62-2 | Vanadium  | <0.0050 | 0.0050 | 0.00062 | mg/L  |   |   | 1   | 6010B  |
| 7440-66-6 | Zinc      | <0.020  | 0.020  | 0.0047  | mg/L  |   |   | 1   | 6010B  |
| 7439-97-6 | Mercury   | <0.20   | 0.20   | 0.070   | ug/L  |   |   | 1   | 7470A  |

*025/2/12*

1A-IN  
INORGANIC ANALYSIS DATA SHEET  
METALS - DISSOLVED

Client Sample ID: JP-L3-GWMW630-0412

Lab Sample ID: 500-45420-4

Lab Name: TestAmerica Chicago

Job No.: 500-45420-1

SDG ID.:

Matrix: Water

Date Sampled: 04/11/2012 10:15

Reporting Basis: WET

Date Received: 04/12/2012 09:00

| CAS No.   | Analyte   | Result  | RL     | MDL     | Units | C | Q | DIL | Method |
|-----------|-----------|---------|--------|---------|-------|---|---|-----|--------|
| 7429-90-5 | Aluminum  | <0.20   | 0.20   | 0.025   | mg/L  |   |   | 1   | 6010B  |
| 7440-36-0 | Antimony  | <0.020  | 0.020  | 0.0026  | mg/L  |   |   | 1   | 6010B  |
| 7440-38-2 | Arsenic   | <0.010  | 0.010  | 0.0024  | mg/L  |   |   | 1   | 6010B  |
| 7440-39-3 | Barium    | 0.011   | 0.010  | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-41-7 | Beryllium | <0.0040 | 0.0040 | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-43-9 | Cadmium   | 0.00078 | 0.0020 | 0.00054 | mg/L  | J |   | 1   | 6010B  |
| 7440-70-2 | Calcium   | 83      | 0.20   | 0.087   | mg/L  |   |   | 1   | 6010B  |
| 7440-47-3 | Chromium  | <0.010  | 0.010  | 0.00096 | mg/L  |   |   | 1   | 6010B  |
| 7440-48-4 | Cobalt    | <0.0050 | 0.0050 | 0.0010  | mg/L  |   |   | 1   | 6010B  |
| 7440-50-8 | Copper    | 0.027   | 0.010  | 0.0011  | mg/L  |   | B | 1   | 6010B  |
| 7439-89-6 | Iron      | <0.20   | 0.20   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7439-92-1 | Lead      | <0.0050 | 0.0050 | 0.0016  | mg/L  |   |   | 1   | 6010B  |
| 7439-95-4 | Magnesium | 43      | 0.10   | 0.024   | mg/L  |   |   | 1   | 6010B  |
| 7439-96-5 | Manganese | 0.033   | 0.010  | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-02-0 | Nickel    | <0.010  | 0.010  | 0.0019  | mg/L  |   |   | 1   | 6010B  |
| 7440-09-7 | Potassium | 4.4     | 0.50   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7782-49-2 | Selenium  | <0.010  | 0.010  | 0.0027  | mg/L  |   |   | 1   | 6010B  |
| 7440-22-4 | Silver    | <0.0050 | 0.0050 | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-23-5 | Sodium    | 22      | 1.0    | 0.12    | mg/L  |   |   | 1   | 6010B  |
| 7440-28-0 | Thallium  | <0.010  | 0.010  | 0.0013  | mg/L  |   |   | 1   | 6010B  |
| 7440-62-2 | Vanadium  | <0.0050 | 0.0050 | 0.00062 | mg/L  |   |   | 1   | 6010B  |
| 7440-66-6 | Zinc      | 0.0087  | 0.020  | 0.0047  | mg/L  | J |   | 1   | 6010B  |
| 7439-97-6 | Mercury   | <0.20   | 0.20   | 0.070   | ug/L  |   |   | 1   | 7470A  |

*CES/21/12*

1A-IN  
INORGANIC ANALYSIS DATA SHEET  
METALS - DISSOLVED

Client Sample ID: JP-L3-GMMW999-0412

Lab Sample ID: 500-45420-5

Lab Name: TestAmerica Chicago

Job No.: 500-45420-1

SDG ID.:

Matrix: Water

Date Sampled: 04/11/2012 12:00

Reporting Basis: WET

Date Received: 04/12/2012 09:00

| CAS No.   | Analyte   | Result  | RL     | MDL     | Units | C | Q | DIL | Method |
|-----------|-----------|---------|--------|---------|-------|---|---|-----|--------|
| 7429-90-5 | Aluminum  | <0.20   | 0.20   | 0.025   | mg/L  |   |   | 1   | 6010B  |
| 7440-36-0 | Antimony  | <0.020  | 0.020  | 0.0026  | mg/L  |   |   | 1   | 6010B  |
| 7440-38-2 | Arsenic   | <0.010  | 0.010  | 0.0024  | mg/L  |   |   | 1   | 6010B  |
| 7440-39-3 | Barium    | 0.011   | 0.010  | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-41-7 | Beryllium | <0.0040 | 0.0040 | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-43-9 | Cadmium   | 0.00087 | 0.0020 | 0.00054 | mg/L  | J |   | 1   | 6010B  |
| 7440-70-2 | Calcium   | 84      | 0.20   | 0.087   | mg/L  |   |   | 1   | 6010B  |
| 7440-47-3 | Chromium  | <0.010  | 0.010  | 0.00096 | mg/L  |   |   | 1   | 6010B  |
| 7440-48-4 | Cobalt    | <0.0050 | 0.0050 | 0.0010  | mg/L  |   |   | 1   | 6010B  |
| 7440-50-8 | Copper    | 0.020   | 0.010  | 0.0011  | mg/L  |   | B | 1   | 6010B  |
| 7439-89-6 | Iron      | <0.20   | 0.20   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7439-92-1 | Lead      | <0.0050 | 0.0050 | 0.0016  | mg/L  |   |   | 1   | 6010B  |
| 7439-95-4 | Magnesium | 44      | 0.10   | 0.024   | mg/L  |   |   | 1   | 6010B  |
| 7439-96-5 | Manganese | 0.032   | 0.010  | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-02-0 | Nickel    | <0.010  | 0.010  | 0.0019  | mg/L  |   |   | 1   | 6010B  |
| 7440-09-7 | Potassium | 4.4     | 0.50   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7782-49-2 | Selenium  | <0.010  | 0.010  | 0.0027  | mg/L  |   |   | 1   | 6010B  |
| 7440-22-4 | Silver    | <0.0050 | 0.0050 | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-23-5 | Sodium    | 22      | 1.0    | 0.12    | mg/L  |   |   | 1   | 6010B  |
| 7440-28-0 | Thallium  | <0.010  | 0.010  | 0.0013  | mg/L  |   |   | 1   | 6010B  |
| 7440-62-2 | Vanadium  | <0.0050 | 0.0050 | 0.00062 | mg/L  |   |   | 1   | 6010B  |
| 7440-66-6 | Zinc      | <0.020  | 0.020  | 0.0047  | mg/L  |   |   | 1   | 6010B  |
| 7439-97-6 | Mercury   | <0.20   | 0.20   | 0.070   | ug/L  |   |   | 1   | 7470A  |

*CRS/2/12*

1A-IN  
INORGANIC ANALYSIS DATA SHEET  
METALS - DISSOLVED

Client Sample ID: JP-L3-GWMW412-0412

Lab Sample ID: 500-45420-7

Lab Name: TestAmerica Chicago

Job No.: 500-45420-1

SDG ID.:

Matrix: Water

Date Sampled: 04/11/2012 12:10

Reporting Basis: WET

Date Received: 04/12/2012 09:00

| CAS No.   | Analyte   | Result  | RL     | MDL     | Units | C | Q | DIL | Method |
|-----------|-----------|---------|--------|---------|-------|---|---|-----|--------|
| 7429-90-5 | Aluminum  | <0.20   | 0.20   | 0.025   | mg/L  |   |   | 1   | 6010B  |
| 7440-36-0 | Antimony  | <0.020  | 0.020  | 0.0026  | mg/L  |   |   | 1   | 6010B  |
| 7440-38-2 | Arsenic   | <0.010  | 0.010  | 0.0024  | mg/L  |   |   | 1   | 6010B  |
| 7440-39-3 | Barium    | 0.042   | 0.010  | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-41-7 | Beryllium | <0.0040 | 0.0040 | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-43-9 | Cadmium   | 0.0011  | 0.0020 | 0.00054 | mg/L  | J |   | 1   | 6010B  |
| 7440-70-2 | Calcium   | 96      | 0.20   | 0.087   | mg/L  |   |   | 1   | 6010B  |
| 7440-47-3 | Chromium  | <0.010  | 0.010  | 0.00096 | mg/L  |   |   | 1   | 6010B  |
| 7440-48-4 | Cobalt    | <0.0050 | 0.0050 | 0.0010  | mg/L  |   |   | 1   | 6010B  |
| 7440-50-8 | Copper    | 0.026   | 0.010  | 0.0011  | mg/L  |   | B | 1   | 6010B  |
| 7439-89-6 | Iron      | <0.20   | 0.20   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7439-92-1 | Lead      | <0.0050 | 0.0050 | 0.0016  | mg/L  |   |   | 1   | 6010B  |
| 7439-95-4 | Magnesium | 51      | 0.10   | 0.024   | mg/L  |   |   | 1   | 6010B  |
| 7439-96-5 | Manganese | <0.010  | 0.010  | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-02-0 | Nickel    | <0.010  | 0.010  | 0.0019  | mg/L  |   |   | 1   | 6010B  |
| 7440-09-7 | Potassium | 1.0     | 0.50   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7782-49-2 | Selenium  | <0.010  | 0.010  | 0.0027  | mg/L  |   |   | 1   | 6010B  |
| 7440-22-4 | Silver    | <0.0050 | 0.0050 | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-23-5 | Sodium    | 7.7     | 1.0    | 0.12    | mg/L  |   |   | 1   | 6010B  |
| 7440-28-0 | Thallium  | <0.010  | 0.010  | 0.0013  | mg/L  |   |   | 1   | 6010B  |
| 7440-62-2 | Vanadium  | <0.0050 | 0.0050 | 0.00062 | mg/L  |   |   | 1   | 6010B  |
| 7440-66-6 | Zinc      | <0.020  | 0.020  | 0.0047  | mg/L  |   |   | 1   | 6010B  |
| 7439-97-6 | Mercury   | <0.20   | 0.20   | 0.070   | ug/L  |   |   | 1   | 7470A  |

*CRSK/12*

1A-IN  
INORGANIC ANALYSIS DATA SHEET  
METALS - DISSOLVED

Client Sample ID: JP-L3-GWMW633-0412

Lab Sample ID: 500-45420-8

Lab Name: TestAmerica Chicago

Job No.: 500-45420-1

SDG ID.:

Matrix: Water

Date Sampled: 04/11/2012 13:05

Reporting Basis: WET

Date Received: 04/12/2012 09:00

| CAS No.   | Analyte   | Result  | RL     | MDL     | Units | C | Q | DIL | Method |
|-----------|-----------|---------|--------|---------|-------|---|---|-----|--------|
| 7429-90-5 | Aluminum  | <0.20   | 0.20   | 0.025   | mg/L  |   |   | 1   | 6010B  |
| 7440-36-0 | Antimony  | <0.020  | 0.020  | 0.0026  | mg/L  |   |   | 1   | 6010B  |
| 7440-38-2 | Arsenic   | <0.010  | 0.010  | 0.0024  | mg/L  |   |   | 1   | 6010B  |
| 7440-39-3 | Barium    | 0.047   | 0.010  | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-41-7 | Beryllium | <0.0040 | 0.0040 | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-43-9 | Cadmium   | 0.00079 | 0.0020 | 0.00054 | mg/L  | J |   | 1   | 6010B  |
| 7440-70-2 | Calcium   | 83      | 0.20   | 0.087   | mg/L  |   |   | 1   | 6010B  |
| 7440-47-3 | Chromium  | <0.010  | 0.010  | 0.00096 | mg/L  |   |   | 1   | 6010B  |
| 7440-48-4 | Cobalt    | <0.0050 | 0.0050 | 0.0010  | mg/L  |   |   | 1   | 6010B  |
| 7440-50-8 | Copper    | 0.023   | 0.010  | 0.0011  | mg/L  |   | B | 1   | 6010B  |
| 7439-89-6 | Iron      | <0.20   | 0.20   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7439-92-1 | Lead      | <0.0050 | 0.0050 | 0.0016  | mg/L  |   |   | 1   | 6010B  |
| 7439-95-4 | Magnesium | 37      | 0.10   | 0.024   | mg/L  |   |   | 1   | 6010B  |
| 7439-96-5 | Manganese | <0.010  | 0.010  | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-02-0 | Nickel    | <0.010  | 0.010  | 0.0019  | mg/L  |   |   | 1   | 6010B  |
| 7440-09-7 | Potassium | 1.0     | 0.50   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7782-49-2 | Selenium  | <0.010  | 0.010  | 0.0027  | mg/L  |   |   | 1   | 6010B  |
| 7440-22-4 | Silver    | <0.0050 | 0.0050 | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-23-5 | Sodium    | 5.7     | 1.0    | 0.12    | mg/L  |   |   | 1   | 6010B  |
| 7440-28-0 | Thallium  | <0.010  | 0.010  | 0.0013  | mg/L  |   |   | 1   | 6010B  |
| 7440-62-2 | Vanadium  | <0.0050 | 0.0050 | 0.00062 | mg/L  |   |   | 1   | 6010B  |
| 7440-66-6 | Zinc      | <0.020  | 0.020  | 0.0047  | mg/L  |   |   | 1   | 6010B  |
| 7439-97-6 | Mercury   | <0.20   | 0.20   | 0.070   | ug/L  |   |   | 1   | 7470A  |

*CRS/21/12*

1A-IN  
INORGANIC ANALYSIS DATA SHEET  
METALS - DISSOLVED

Client Sample ID: JP-L3-SW777-0412

Lab Sample ID: 500-45420-9

Lab Name: TestAmerica Chicago

Job No.: 500-45420-1

SDG ID.:

Matrix: Water

Date Sampled: 04/11/2012 13:25

Reporting Basis: WET

Date Received: 04/12/2012 09:00

| CAS No.   | Analyte   | Result  | RL     | MDL     | Units | C | Q | DIL | Method |
|-----------|-----------|---------|--------|---------|-------|---|---|-----|--------|
| 7429-90-5 | Aluminum  | <0.20   | 0.20   | 0.025   | mg/L  |   |   | 1   | 6010B  |
| 7440-36-0 | Antimony  | <0.020  | 0.020  | 0.0026  | mg/L  |   |   | 1   | 6010B  |
| 7440-38-2 | Arsenic   | <0.010  | 0.010  | 0.0024  | mg/L  |   |   | 1   | 6010B  |
| 7440-39-3 | Barium    | 0.039   | 0.010  | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-41-7 | Beryllium | <0.0040 | 0.0040 | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-43-9 | Cadmium   | 0.00087 | 0.0020 | 0.00054 | mg/L  | J |   | 1   | 6010B  |
| 7440-70-2 | Calcium   | 73      | 0.20   | 0.087   | mg/L  |   |   | 1   | 6010B  |
| 7440-47-3 | Chromium  | <0.010  | 0.010  | 0.00096 | mg/L  |   |   | 1   | 6010B  |
| 7440-48-4 | Cobalt    | <0.0050 | 0.0050 | 0.0010  | mg/L  |   |   | 1   | 6010B  |
| 7440-50-8 | Copper    | 0.0041  | 0.010  | 0.0011  | mg/L  | J | B | 1   | 6010B  |
| 7439-89-6 | Iron      | <0.20   | 0.20   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7439-92-1 | Lead      | <0.0050 | 0.0050 | 0.0016  | mg/L  |   |   | 1   | 6010B  |
| 7439-95-4 | Magnesium | 39      | 0.10   | 0.024   | mg/L  |   |   | 1   | 6010B  |
| 7439-96-5 | Manganese | 0.060   | 0.010  | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-02-0 | Nickel    | <0.010  | 0.010  | 0.0019  | mg/L  |   |   | 1   | 6010B  |
| 7440-09-7 | Potassium | 1.4     | 0.50   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7782-49-2 | Selenium  | <0.010  | 0.010  | 0.0027  | mg/L  |   |   | 1   | 6010B  |
| 7440-22-4 | Silver    | <0.0050 | 0.0050 | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-23-5 | Sodium    | 14      | 1.0    | 0.12    | mg/L  |   |   | 1   | 6010B  |
| 7440-28-0 | Thallium  | <0.010  | 0.010  | 0.0013  | mg/L  |   |   | 1   | 6010B  |
| 7440-62-2 | Vanadium  | <0.0050 | 0.0050 | 0.00062 | mg/L  |   |   | 1   | 6010B  |
| 7440-66-6 | Zinc      | 0.0087  | 0.020  | 0.0047  | mg/L  | J |   | 1   | 6010B  |
| 7439-97-6 | Mercury   | <0.20   | 0.20   | 0.070   | ug/L  |   |   | 1   | 7470A  |

*CRS/24/12*

LDC #: 27595A4

## VALIDATION COMPLETENESS WORKSHEET

Date: 5-11-12

SDG #: 500-45420-1

Level III

Page: 1 of 1

Laboratory: Test America, Inc.

mH.

Reviewer: MG

2nd Reviewer: **METHOD:** Dissolved Metals (EPA SW 846 Method 6010B/7000) 7470A

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                              |    | Comments                                |
|-------|--|----|---|
| I.    | Technical holding times                      | A  | Sampling dates: 4-10-12 through 4-11-12 |
| II.   | ICP/MS Tune                                  | N  | not utilized                            |
| III.  | Calibration                                  | A  |   |
| IV.   | Blanks                                       | SW |   |
| V.    | ICP Interference Check Sample (ICS) Analysis | A  |   |
| VI.   | Matrix Spike Analysis                        | N  | client specified                        |
| VII.  | Duplicate Sample Analysis                    | N  | " "                                     |
| VIII. | Laboratory Control Samples (LCS)             | A  | LCS                                     |
| IX.   | Internal Standard (ICP-MS)                   | N  | not utilized                            |
| X.    | Furnace Atomic Absorption QC                 | N  | " "                                     |
| XI.   | ICP Serial Dilution                          | N  | not performed                           |
| XII.  | Sample Result Verification                   | N  |   |
| XIII. | Overall Assessment of Data                   | A  |   |
| XIV.  | Field Duplicates                             | SW | D = 4 + 5                               |
| XV.   | Field Blanks                                 | N  |   |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

all water

|       |                    |    |     |    |  |    |  |
|-------|--------------------|----|-----|----|--|----|--|
| 1     | JP-L3-SW557-0412   | 11 |     | 21 |  | 31 |  |
| 2     | JP-L3-SW558-0412   | 12 |     | 22 |  | 32 |  |
| 3     | JP-L3-GWMW631-0412 | 13 |     | 23 |  | 33 |  |
| mH. 4 | JP-L3-GWMW632-0412 | 14 |     | 24 |  | 34 |  |
| 5     | JP-L3-GWMW999-0412 | 15 |     | 25 |  | 35 |  |
| 6     | JP-L3-GWMW412-0412 | 16 |     | 26 |  | 36 |  |
| 7     | JP-L3-GWMW633-0412 | 17 |     | 27 |  | 37 |  |
| 8     | JP-L3-SW777-0412   | 18 |     | 28 |  | 38 |  |
| 9     |                    | 19 |     | 29 |  | 39 |  |
| 10    |                    | 20 | PBW | 30 |  | 40 |  |

Notes:

**All circled elements are applicable to each sample.**

[illegible]

Comments: Mercury by CVAA if performed

LDC #: 27595A4

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

PB/ICB/CCB QUALIFIED SAMPLES

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

Soil preparation factor applied: NA

Sample Concentration units, unless otherwise noted: mg/L

Associated Samples: all

Page: 1 of 1  
Reviewer: MG  
2nd Reviewer: 1

| Analyte | Maximum<br>PB <sup>a</sup><br>(mg/Kg) | Maximum<br>PB <sup>a</sup><br>(mg/L) | Maximum<br>ICB/CCB <sup>a</sup><br>(ug/L) | Action<br>Limit | 1     | 2      | 3     | 4     | 5     | 6     | 7     | 8      |  |
|---------|---------------------------------------|--------------------------------------|---|-----------------|-------|--------|-------|-------|-------|-------|-------|--------|--|
| Cu      |                                       | 0.00549                              |   | 0.02745         | 0.023 | 0.0066 | 0.015 | 0.027 | 0.020 | 0.026 | 0.023 | 0.0041 |  |

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC#: 27595A4**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**Page: 1 of 1  
Reviewer: MG  
2nd Reviewer: L**METHOD:** Metals (EPA Method 6010B/6020/7000)Y N NA  
Y N NA

Were field duplicate pairs identified in this SDG?

Were target analytes detected in the field duplicate pairs?

| Analyte   | Concentration (mg/L) |         | (<25)<br>RPD | (mg/L)<br>Difference | (mg/L)<br>Limits | Qualifications<br>(Parent Only) |
|-----------|----------------------|---------|--------------|----------------------|------------------|---------------------------------|
|           | 4                    | 5       |              |                      |                  |                                 |
| Barium    | 0.011                | 0.011   |              | 0                    | (≤0.020)         |                                 |
| Cadmium   | 0.00078              | 0.00087 |              | 0.00009              | (≤0.0040)        |                                 |
| Calcium   | 83                   | 84      | 1            |                      |                  |                                 |
| Copper    | 0.027                | 0.020   |              | 0.007                | (≤0.020)         |                                 |
| Magnesium | 43                   | 44      | 2            |                      |                  |                                 |
| Manganese | 0.033                | 0.032   |              | 0.001                | (≤0.020)         |                                 |
| Potassium | 4.4                  | 4.4     | 0            |                      |                  |                                 |
| Sodium    | 22                   | 22      | 0            |                      |                  |                                 |
| Zinc      | 0.0087               | 0.020U  |              | 0.0113               | (≤0.040)         |                                 |

V:\FIELD DUPLICATES\FD\_inorganic\27595A4.wpd

**Laboratory Data Consultants, Inc.  
Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 10 through April 11, 2012  
**LDC Report Date:** May 23, 2012  
**Matrix:** Water  
**Parameters:** Explosives  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-45420-1

**Sample Identification**

JP-L3-SW557-0412  
JP-L3-SW558-0412  
JP-L3-GWMW631-0412  
JP-L3-GWMW630-0412  
JP-L3-GWMW999-0412  
JP-L3-GWMW410-0412  
JP-L3-GWMW412-0412  
JP-L3-GWMW633-0412  
JP-L3-SW777-0412  
JP-L1-GWMW174-0412  
JP-L1-GWMWWES3-0412  
JP-L1-GWMW173-0412

## Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330 for Explosives.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## **I. Technical Holding Times**

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## **II. Initial Calibration**

Initial calibration of compounds was performed for the primary (quantitation) column and confirmation column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

## **III. Continuing Calibration**

Continuing calibration was performed at the required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No explosive contaminants were found in the method blanks.

No field blanks were identified in this SDG.

## **V. Surrogate Recovery**

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for sample 23173-SB-022W. Since the sample was diluted out, no data were qualified.

## **VI. Matrix Spike/Matrix Spike Duplicates**

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## **VII. Laboratory Control Samples**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| LCS ID<br>(Associated<br>Samples)                          | Compound | LCS<br>%R (Limits) | LCSD<br>%R (Limits) | RPD<br>(Limits) | Flag            | A or P |
|--|----------|--------------------|---------------------|-----------------|-----------------|--------|
| LCS/D500-146630/2-A<br>(All samples in SDG<br>500-45420-1) | HMX      | 116 (80-115)       | 121 (80-115)        | -               | J (all detects) | P      |

### VIII. Target Compound Identification

Raw data were not reviewed for this SDG.

### IX. Compound Quantitation and RLs

The sample results for detected compounds from the two columns were within 40% difference with the following exceptions:

| Sample             | Compound   | %D           | Flag                               | A or P |
|--------------------|--|--------------|------------------------------------|--------|
| JP-L3-GWMW630-0412 | 4-Amino-2,6-dinitrotoluene<br>2-Amino-4,6-dinitrotoluene | 47.9<br>53.3 | J (all detects)<br>J (all detects) | A      |
| JP-L3-GWMW999-0412 | 4-Amino-2,6-dinitrotoluene<br>2-Amino-4,6-dinitrotoluene | 61.7<br>58.1 | J (all detects)<br>J (all detects) | A      |
| JP-L3-GWMW412-0412 | 1,3,5-Trinitrobenzene                                    | 51.3         | J (all detects)                    | A      |

Raw data were not reviewed for this SDG.

### X. System Performance

Raw data were not reviewed for this SDG.

### XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### XII. Field Duplicates

Samples JP-L3-GWMW630-0412 and JP-L3-GWMW999-0412 were identified as field duplicates. No explosives were detected in any of the samples with the following exceptions:

| Compound                   | Concentration (ug/L) |                    | RPD<br>(Limits) | Difference<br>(Limits) | Flags | A or P |
|----------------------------|----------------------|--------------------|-----------------|------------------------|-------|--------|
|                            | JP-L3-GWMW630-0412   | JP-L3-GWMW999-0412 |                 |                        |       |        |
| HMX                        | 4.7                  | 4.7                | 0 (≤25)         | -                      | -     | -      |
| 2-Amino-4,6-dinitrotoluene | 0.077                | 0.072              | -               | 0.005 (≤0.31)          | -     | -      |
| 4-Amino-2,6-dinitrotoluene | 0.18                 | 0.15               | -               | 0.03 (≤0.31)           | -     | -      |
| RDX                        | 8.7                  | 8.7                | 0 (≤25)         | -                      | -     | -      |

**JOAAP-GW****Explosives - Data Qualification Summary - SDG 500-45420-1**

| SDG         | Sample  | Compound   | Flag                               | A or P | Reason  |
|-------------|---|--|------------------------------------|--------|---|
| 500-45420-1 | JP-L3-SW557-0412<br>JP-L3-SW558-0412<br>JP-L3-GWMW631-0412<br>JP-L3-GWMW630-0412<br>JP-L3-GWMW999-0412<br>JP-L3-GWMW410-0412<br>JP-L3-GWMW412-0412<br>JP-L3-GWMW633-0412<br>JP-L3-SW777-0412<br>JP-L1-GWMW174-0412<br>JP-L1-GWMWVES3-0412<br>JP-L1-GWMW173-0412 | HMX  | J (all detects)                    | P      | Laboratory control samples (%R)                   |
| 500-45420-1 | JP-L3-GWMW630-0412<br>JP-L3-GWMW999-0412  | 4-Amino-2,6-dinitrotoluene<br>2-Amino-4,6-dinitrotoluene | J (all detects)<br>J (all detects) | A      | Compound quantitation and RLs (column difference) |
| 500-45420-1 | JP-L3-GWMW412-0412  | 1,3,5-Trinitrobenzene                                    | J (all detects)                    | A      | Compound quantitation and RLs (column difference) |

**JOAAP-GW****Explosives - Laboratory Blank Data Qualification Summary - SDG 500-45420-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Explosives - Field Blank Data Qualification Summary - SDG 500-45420-1**

No Sample Data Qualified in this SDG

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L3-SW557-0412

Lab Sample ID: 500-45420-1

Date Sampled: 04/10/2012 1640

Client Matrix: Water

Date Received: 04/12/2012 0900

**8330 Nitroaromatics and Nitramines (HPLC)**

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146545 | Instrument ID:         | INST35-36 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146630 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/18/2012 0144 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/17/2012 0940 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | 1.1           | S         | 0.12  | 0.31 |
| RDX                        | 3.2           | *         | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 112  |           | 70 - 130          |

*025/23/12*

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L3-SW558-0412

Lab Sample ID: 500-45420-2

Date Sampled: 04/10/2012 1620

Client Matrix: Water

Date Received: 04/12/2012 0900

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146545 | Instrument ID: INST35-36      |
| Prep Method: 3535              | Prep Batch: 500-146630     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/18/2012 0218 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/17/2012 0940     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL               | RL   |
|----------------------------|---------------|-----------|-------------------|------|
| HMX                        | <0.31         |           | 0.12              | 0.31 |
| RDX                        | <0.16         | *         | 0.077             | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039             | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033             | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032             | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036             | 0.16 |
| Tetryl                     | <0.39         |           | 0.065             | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032             | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071             | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035             | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074             | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082             | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082             | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14              | 0.31 |
| Surrogate                  | %Rec          | Qualifier | Acceptance Limits |      |
| 1,2-Dinitrobenzene         | 120           |           | 70 - 130          |      |

025/23/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L3-GWMW631-0412

Lab Sample ID: 500-45420-3

Date Sampled: 04/11/2012 0940

Client Matrix: Water

Date Received: 04/12/2012 0900

**8330 Nitroaromatics and Nitramines (HPLC)**

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146545 | Instrument ID:         | INST35-36 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146630 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/18/2012 0253 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/17/2012 0940 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         | *         | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 114  |           | 70 - 130          |

CES/23/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L3-GWMW630-0412

Lab Sample ID: 500-45420-4

Date Sampled: 04/11/2012 1015

Client Matrix: Water

Date Received: 04/12/2012 0900

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146545 | Instrument ID: INST35-36      |
| Prep Method: 3535              | Prep Batch: 500-146630     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/18/2012 0327 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/17/2012 0940     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L)   | Qualifier | MDL   | RL   |
|----------------------------|-----------------|-----------|-------|------|
| HMX                        | 4.7 <i>JP</i>   |           | 0.12  | 0.31 |
| 1,3,5-Trinitrobenzene      | <0.16           |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16           |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16           |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16           |           | 0.036 | 0.16 |
| Tetryl                     | <0.39           |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31           |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31           |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | 0.077 <i>JP</i> | J         | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | 0.18 <i>JP</i>  | J         | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31           |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31           |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31           |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 115  |           | 70 - 130          |

*CRS/23/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L3-GWMW630-0412

Lab Sample ID: 500-45420-4

Date Sampled: 04/11/2012 1015

Client Matrix: Water

Date Received: 04/12/2012 0900

### 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146545 | Instrument ID:         | INST35-36 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146630 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 10              |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/19/2012 2103 | Run Type:       | DL         | Injection Volume:      | 100 µL    |
| Prep Date:       | 04/17/2012 0940 |                 |            | Result Type:           | PRIMARY   |

| Analyte | Result (ug/L) | Qualifier | MDL  | RL  |
|---------|---------------|-----------|------|-----|
| RDX     | 8.7           | *         | 0.77 | 1.6 |

QES/23/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L3-GWMW999-0412

Lab Sample ID: 500-45420-5

Date Sampled: 04/11/2012 1200

Client Matrix: Water

Date Received: 04/12/2012 0900

**8330 Nitroaromatics and Nitramines (HPLC)**

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146545 | Instrument ID: INST35-36      |
| Prep Method: 3535              | Prep Batch: 500-146630     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/18/2012 0401 |                            | Injection Volume: 100 µL      |
| Prep Date: 04/17/2012 0940     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L)  | Qualifier | MDL   | RL   |
|----------------------------|----------------|-----------|-------|------|
| HMX                        | 4.7 <i>S</i>   |           | 0.12  | 0.31 |
| 1,3,5-Trinitrobenzene      | <0.16          |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16          |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16          |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16          |           | 0.036 | 0.16 |
| Tetryl                     | <0.39          |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31          |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31          |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | 0.072 <i>S</i> | J         | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | 0.15 <i>S</i>  | J         | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31          |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31          |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31          |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 117  |           | 70 - 130          |

*CRS/23/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L3-GWMW999-0412

Lab Sample ID: 500-45420-5

Date Sampled: 04/11/2012 1200

Client Matrix: Water

Date Received: 04/12/2012 0900

### 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146545 | Instrument ID: INST35-36      |
| Prep Method: 3535              | Prep Batch: 500-146630     | Initial Weight/Volume: 770 mL |
| Dilution: 10                   |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/19/2012 2137 | Run Type: DL               | Injection Volume: 100 µL      |
| Prep Date: 04/17/2012 0940     |                            | Result Type: PRIMARY          |

| Analyte | Result (ug/L) | Qualifier | MDL  | RL  |
|---------|---------------|-----------|------|-----|
| RDX     | 8.7           | *         | 0.77 | 1.6 |

QRS/23/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L3-GWMW410-0412

Lab Sample ID: 500-45420-6

Date Sampled: 04/11/2012 1110

Client Matrix: Water

Date Received: 04/12/2012 0900

**8330 Nitroaromatics and Nitramines (HPLC)**

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146545 | Instrument ID:         | INST35-36 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146630 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/18/2012 0435 |                 |            | Injection Volume:      | 100 µL    |
| Prep Date:       | 04/17/2012 0940 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         | *         | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 114  |           | 70 - 130          |

025/23/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L3-GWMW412-0412

Lab Sample ID: 500-45420-7

Date Sampled: 04/11/2012 1210

Client Matrix: Water

Date Received: 04/12/2012 0900

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146545 | Instrument ID: INST35-36      |
| Prep Method: 3535              | Prep Batch: 500-146630     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/18/2012 0509 |                            | Injection Volume: 100 µL      |
| Prep Date: 04/17/2012 0940     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| 1,3,5-Trinitrobenzene      | 0.11 <i>S</i> | J         | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | 0.24          |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | 0.89          |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | 1.7           |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 116  |           | 70 - 130          |

*CRS/b3/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L3-GWMW412-0412

Lab Sample ID: 500-45420-7

Date Sampled: 04/11/2012 1210

Client Matrix: Water

Date Received: 04/12/2012 0900

### 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146545 | Instrument ID:         | INST35-36 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146630 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 10              |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/19/2012 2211 | Run Type:       | DL         | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/17/2012 0940 |                 |            | Result Type:           | PRIMARY   |

| Analyte | Result (ug/L) | Qualifier | MDL | RL  |
|---------|---------------|-----------|-----|-----|
| HMX     | 28 <i>S</i>   |           | 1.2 | 3.1 |

*CRS/03/12*

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L3-GWMW412-0412

Lab Sample ID: 500-45420-7

Client Matrix: Water

Date Sampled: 04/11/2012 1210

Date Received: 04/12/2012 0900

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146545 | Instrument ID: INST35-36      |
| Prep Method: 3535              | Prep Batch: 500-146630     | Initial Weight/Volume: 770 mL |
| Dilution: 100                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/19/2012 2245 | Run Type: DL2              | Injection Volume: 100 µL      |
| Prep Date: 04/17/2012 0940     |                            | Result Type: PRIMARY          |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---------|---------------|-----------|-----|----|
| RDX     | 120           | *         | 7.7 | 16 |

QES/23/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L3-GWMW633-0412

Lab Sample ID: 500-45420-8

Date Sampled: 04/11/2012 1305

Client Matrix: Water

Date Received: 04/12/2012 0900

**8330 Nitroaromatics and Nitramines (HPLC)**

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146545 | Instrument ID: INST35-36      |
| Prep Method: 3535              | Prep Batch: 500-146630     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/18/2012 0617 |                            | Injection Volume: 100 µL      |
| Prep Date: 04/17/2012 0940     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | 2.0           |           | 0.12  | 0.31 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 114  |           | 70 - 130          |

CRS/23/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L3-GWMW633-0412

Lab Sample ID: 500-45420-8

Date Sampled: 04/11/2012 1305

Client Matrix: Water

Date Received: 04/12/2012 0900

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146545 | Instrument ID: INST35-36      |
| Prep Method: 3535              | Prep Batch: 500-146630     | Initial Weight/Volume: 770 mL |
| Dilution: 10                   |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/19/2012 2319 | Run Type: DL               | Injection Volume: 100 µL      |
| Prep Date: 04/17/2012 0940     |                            | Result Type: PRIMARY          |

| Analyte | Result (ug/L) | Qualifier | MDL  | RL  |
|---------|---------------|-----------|------|-----|
| RDX     | 6.7           | *         | 0.77 | 1.6 |

025/23/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L3-SW777-0412

Lab Sample ID: 500-45420-9

Client Matrix: Water

Date Sampled: 04/11/2012 1325

Date Received: 04/12/2012 0900

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146545 | Instrument ID: INST35-36      |
| Prep Method: 3535              | Prep Batch: 500-146630     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/18/2012 0651 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/17/2012 0940     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL               | RL   |
|----------------------------|---------------|-----------|-------------------|------|
| HMX                        | <0.31         |           | 0.12              | 0.31 |
| RDX                        | 0.25          | *         | 0.077             | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039             | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033             | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032             | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036             | 0.16 |
| Tetryl                     | <0.39         |           | 0.065             | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032             | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071             | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035             | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074             | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082             | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082             | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14              | 0.31 |
| Surrogate                  | %Rec          | Qualifier | Acceptance Limits |      |
| 1,2-Dinitrobenzene         | 129           |           | 70 - 130          |      |

025/23/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L1-GWMW174-0412

Lab Sample ID: 500-45420-10

Date Sampled: 04/11/2012 1305

Client Matrix: Water

Date Received: 04/12/2012 0900

**8330 Nitroaromatics and Nitramines (HPLC)**

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146545 | Instrument ID:         | INST35-36 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146630 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/18/2012 0725 |                 |            | Injection Volume:      | 100 µL    |
| Prep Date:       | 04/17/2012 0940 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         | *         | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 114  |           | 70 - 130          |

CRS/23/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L1-GWMWWES3-0412

Lab Sample ID: 500-45420-11

Date Sampled: 04/11/2012 1600

Client Matrix: Water

Date Received: 04/12/2012 0900

## 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146545 | Instrument ID:         | INST35-36 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146630 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/18/2012 0759 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/17/2012 0940 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | 0.74          | *         | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | 0.20          |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | 1.2           |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | 0.67          |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | 1.0           |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 117  |           | 70 - 130          |

CRS/23/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L1-GWMW173-0412

Lab Sample ID: 500-45420-12

Date Sampled: 04/11/2012 1400

Client Matrix: Water

Date Received: 04/12/2012 0900

### 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146545 | Instrument ID:         | INST35-36 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146630 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/18/2012 0833 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/17/2012 0940 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | 1.4           | J         | 0.12  | 0.31 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | 4.8           |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | 5.4           |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 115  |           | 70 - 130          |

CR 5/23/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45420-1

Client Sample ID: JP-L1-GWMW173-0412

Lab Sample ID: 500-45420-12

Date Sampled: 04/11/2012 1400

Client Matrix: Water

Date Received: 04/12/2012 0900

### 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146545 | Instrument ID:         | INST35-36 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146630 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 10              |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/19/2012 2353 | Run Type:       | DL         | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/17/2012 0940 |                 |            | Result Type:           | PRIMARY   |

| Analyte               | Result (ug/L) | Qualifier | MDL  | RL  |
|-----------------------|---------------|-----------|------|-----|
| RDX                   | 10            | *         | 0.77 | 1.6 |
| 2,4,6-Trinitrotoluene | 12            |           | 0.36 | 1.6 |

04/23/12

LDC #: 27595A40  
 SDG #: 500-45420-1  
 Laboratory: Test America, Inc.

# VALIDATION COMPLETENESS WORKSHEET Level III

Date: 5/15/12  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD:** HPLC Explosives (EPA SW 846 Method 8330)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                      |                 | Comments                     |
|-------|--------------------------------------|-----------------|------------------------------|
| I.    | Technical holding times              | A               | Sampling dates: 4/10-4/11/12 |
| II.   | Initial calibration                  | A               | 1. RSD $\leq$ 20%            |
| III.  | Calibration verification/ICV         | <del>SW</del> A | 1. D $\leq$ 15% , 1cv/ccv    |
| IV.   | Blanks                               | A               |                              |
| V.    | Surrogate recovery                   | SW              |                              |
| VI.   | Matrix spike/Matrix spike duplicates | N               |                              |
| VII.  | Laboratory control samples           | SW              | LCS/D                        |
| VIII. | Target compound identification       | N               |                              |
| IX.   | Compound quantitation/RL/LOQ/LODs    | SW              |                              |
| X.    | System Performance                   | N               |                              |
| XI.   | Overall assessment of data           | A               |                              |
| XII.  | Field duplicates                     | SW              | FD=4.5                       |
| XIII. | Field blanks                         | N               |                              |

Note: A = Acceptable  
 N = Not provided/applicable  
 SW = See worksheet

ND = No compounds detected  
 R = Rinsate  
 FB = Field blank

D = Duplicate  
 TB = Trip blank  
 EB = Equipment blank

Validated Samples: WATER

|    |                    |    |                    |    |          |    |  |
|----|--------------------|----|--------------------|----|----------|----|--|
| 1  | JP-L3-SW557-0412   | 11 | JP-L3-GWMWES3-0412 | 21 | 146630MB | 31 |  |
| 2  | JP-L3-SW558-0412   | 12 | JP-L3-GWMW173-0412 | 22 |          | 32 |  |
| 3  | JP-L3-GWMW633-0412 | 13 | BDL                | 23 |          | 33 |  |
| 4  | JP-L3-GWMW633-0412 | 14 |                    | 24 |          | 34 |  |
| 5  | JP-L3-GWMW999-0412 | 15 |                    | 25 |          | 35 |  |
| 6  | JP-L3-GWMW410-0412 | 16 |                    | 26 |          | 36 |  |
| 7  | JP-L3-GWMW412-0412 | 17 |                    | 27 |          | 37 |  |
| 8  | JP-L3-GWMW633-0412 | 18 |                    | 28 |          | 38 |  |
| 9  | JP-L3-SW777-0412   | 19 |                    | 29 |          | 39 |  |
| 10 | JP-L3-GWMW174-0412 | 20 |                    | 30 |          | 40 |  |

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

# VALIDATION FINDINGS WORKSHEET

METHOD: GC / HPLC

| 8310                      | 8330                          | 8151                 | 8141                | 8141(Con't)           | 8021B             |
|---------------------------|-------------------------------|----------------------|---------------------|-----------------------|-------------------|
| A. Acenaphthene           | A. HMX                        | A. 2,4-D             | A. Dichlorvos       | V. Fensulfothion      | V. Benzene        |
| B. Acenaphthylene         | B. RDX                        | B. 2,4-DB            | B. Mevinphos        | W. Bolstar            | CC. Toluene       |
| C. Anthracene             | C. 1,3,5-Trinitrobenzene      | C. 2,4,5-T           | C. Demeton-O        | X. EPN                | EE. Ethyl Benzene |
| D. Benzo(a)anthracene     | D. 1,3-Dinitrobenzene         | D. 2,4,5-TP          | D. Demeton-S        | Y. Azinphos-methyl    | SSS. O-Xylene     |
| E. Benzo(a)pyrene         | E. Tetra                      | E. Dinoseb           | E. Ethoprop         | Z. Coumaphos          | RRR. MP-Xylene    |
| F. Benzo(b)fluoranthene   | F. Nitrobenzene               | F. Dichlorprop       | F. Naled            | AA. Parathion         | GG. Total Xylene  |
| G. Benzo(g,h,i)perylene   | G. 2,4,6-Trinitrotoluene      | G. Dicamba           | G. Sulfotep         | BB. Trichloronate     |                   |
| H. Benzo(k)fluoranthene   | H. 4-Amino-2,6-dinitrotoluene | H. Dalapon           | H. Phorate          | CC. Trichlorinate     |                   |
| I. Chrysene               | I. 2-Amino-4,6-dinitrotoluene | I. MCP               | I. Dimethoate       | DD. Trifluralin       |                   |
| J. Dibenzo(a,h)anthracene | J. 2,4-Dinitrotoluene         | J. MCPA              | J. Diazinon         | EE. Def               |                   |
| K. Fluoranthene           | K. 2,6-Dinitrotoluene         | K. Pentachlorophenol | K. Disulfoton       | FF. Prowl             |                   |
| L. Fluorene               | L. 2-Nitrotoluene             | L. 2,4,5-TP (silvex) | L. Parathion-methyl | GG. Ethion            |                   |
| M. Indeno(1,2,3-cd)pyrene | M. 3-Nitrotoluene             | M. Silvex            | M. Ronnel           | HH. Famphur           |                   |
| N. Naphthalene            | N. 4-Nitrotoluene             |                      | N. Malathion        | II. Phosmet           |                   |
| O. Phenanthrene           | O. Nitroglycerin              |                      | O. Chlorpyrifos     | JJ. Tetrachlorvinphos |                   |
| P. Pyrene                 | P.                            |                      | P. Fenthion         | KK. Demeton (total)   |                   |
| Q.                        | Q                             |                      | Q. Parathion-ethyl  |                       |                   |
| R.                        |                               |                      | R. Trichloronate    |                       |                   |
| S.                        |                               |                      | S. Merphos          |                       |                   |
|                           |                               |                      | T. Stirofos         |                       |                   |
|                           |                               |                      | U. Tokuthion        |                       |                   |

Notes:

## Surrogate Recovery

METHOD: GC ☒ HPLC

Are surrogates required by the method? Yes ☒ or No ☐

Where appropriate, please circle the number of the response that best describes your answer. If you are unsure, please circle the number of the response that is closest to your answer. If you do not know the answer, please circle the number of the response that is closest to your answer. If you do not know the answer, please circle the number of the response that is closest to your answer.

Were surrogates spiked into all samples and blanks?

Y N N/A

Y/N N/A

[illegible]

METHOD: GC ~~HPLC~~

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A

Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCS-D) analyzed for each matrix in this SDG?  
Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

Y(N)N/A

Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

Level ~~IV~~D Only
$$\frac{Y_N(N/A)}{Y_N(N/A)}$$

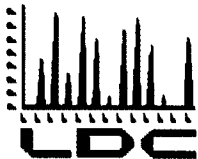
Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

[illegible]

COMQUA%DNNew.wpd



**LDC Validation Report #27605**  
**(April 2012 Samples)**



## Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437

Web [www.lab-data.com](http://www.lab-data.com)

Fax 760.634.0439

Toltest.  
5201 Jewell Lane  
Poducah KY 42001  
ATTN: Mr. Gary Reside

May 24, 2012

SUBJECT: JOAAP-GW, Data Validation

Dear Mr. Reside,

Enclosed is the final validation report for the fractions listed below. This SDG was received on May 9, 2012. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 27605:**

| <b><u>SDG #</u></b> | <b><u>Fraction</u></b>                          |
|---------------------|---|
| 500-45457-1         | Dissolved Metals, Dissolved Sulfate, Explosives |

The data validation was performed under EPA Level III guidelines. The analyses were validated using the following documents, as applicable to each method:

- Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. Rev. 0 July 2009
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1, April 2009
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink  
Project Manager/Chemist

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

**Laboratory Data Consultants, Inc.  
Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 10, 2012  
**LDC Report Date:** May 14, 2012  
**Matrix:** Water  
**Parameters:** Dissolved Metals  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-45457-1

**Sample Identification**

JP-L3-SW004-0412  
JP-L3-SW004-0412MS  
JP-L3-SW004-0412MSD  
JP-L3-SW004-0412DUP

## Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B and 7470A for Dissolved Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. ICPMS Tune

ICP-MS was not utilized in this SDG.

## III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No dissolved metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

| Method Blank ID | Analyte                   | Maximum Concentration                      | Associated Samples             |
|-----------------|---------------------------|--|--------------------------------|
| PB (prep blank) | Calcium<br>Copper<br>Zinc | 0.100 mg/L<br>0.00556 mg/L<br>0.00582 mg/L | All samples in SDG 500-45457-1 |

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

| Sample           | Analyte | Reported Concentration | Modified Final Concentration |
|------------------|---------|------------------------|------------------------------|
| JP-L3-SW004-0412 | Copper  | 0.018 mg/L             | 0.018U mg/L                  |

No field blanks were identified in this SDG.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

#### **VI. Matrix Spike/(Matrix Spike) Duplicates**

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

#### **VII. Duplicate Sample Analysis**

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

#### **VIII. Laboratory Control Samples (LCS)**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

#### **IX. Internal Standards (ICP-MS)**

ICP-MS was not utilized in this SDG.

#### **X. Furnace Atomic Absorption QC**

Graphite furnace atomic absorption was not utilized in this SDG.

#### **XI. ICP Serial Dilution**

ICP serial dilution analysis was not performed by the laboratory.

#### **XII. Sample Result Verification**

Raw data were not reviewed for this SDG.

#### **XIII. Overall Assessment of Data**

Data flags are summarized at the end of this report if data has been qualified.

#### **XIV. Field Duplicates**

No field duplicates were identified in this SDG.

**JOAAP-GW****Dissolved Metals - Data Qualification Summary - SDG 500-45457-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 500-45457-1**

| SDG         | Sample           | Analyte | Modified Final Concentration | A or P |
|-------------|------------------|---------|------------------------------|--------|
| 500-45457-1 | JP-L3-SW004-0412 | Copper  | 0.018U mg/L                  | A      |

**JOAAP-GW****Dissolved Metals - Field Blank Data Qualification Summary - SDG 500-45457-1**

No Sample Data Qualified in this SDG

1A-IN  
INORGANIC ANALYSIS DATA SHEET  
METALS - DISSOLVED

Client Sample ID: JP-L3-SW004-0412

Lab Sample ID: 500-45457-1

Lab Name: TestAmerica Chicago

Job No.: 500-45457-1

SDG ID.:

Matrix: Water

Date Sampled: 04/10/2012 15:45

Reporting Basis: WET

Date Received: 04/14/2012 07:00

| CAS No.   | Analyte   | Result  | RL     | MDL     | Units | C | Q | DIL | Method |
|-----------|-----------|---------|--------|---------|-------|---|---|-----|--------|
| 7429-90-5 | Aluminum  | <0.20   | 0.20   | 0.025   | mg/L  |   |   | 1   | 6010B  |
| 7440-36-0 | Antimony  | <0.020  | 0.020  | 0.0026  | mg/L  |   |   | 1   | 6010B  |
| 7440-38-2 | Arsenic   | <0.010  | 0.010  | 0.0024  | mg/L  |   |   | 1   | 6010B  |
| 7440-39-3 | Barium    | 0.039   | 0.010  | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-41-7 | Beryllium | <0.0040 | 0.0040 | 0.00044 | mg/L  |   |   | 1   | 6010B  |
| 7440-43-9 | Cadmium   | 0.00090 | 0.0020 | 0.00054 | mg/L  | J |   | 1   | 6010B  |
| 7440-70-2 | Calcium   | 73      | 0.20   | 0.087   | mg/L  |   | B | 1   | 6010B  |
| 7440-47-3 | Chromium  | <0.010  | 0.010  | 0.00096 | mg/L  |   |   | 1   | 6010B  |
| 7440-48-4 | Cobalt    | <0.0050 | 0.0050 | 0.0010  | mg/L  |   |   | 1   | 6010B  |
| 7440-50-8 | Copper    | 0.018   | 0.010  | 0.0011  | mg/L  |   | B | 1   | 6010B  |
| 7439-89-6 | Iron      | <0.20   | 0.20   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7439-92-1 | Lead      | <0.0050 | 0.0050 | 0.0016  | mg/L  |   |   | 1   | 6010B  |
| 7439-95-4 | Magnesium | 38      | 0.10   | 0.024   | mg/L  |   |   | 1   | 6010B  |
| 7439-96-5 | Manganese | 0.090   | 0.010  | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-02-0 | Nickel    | <0.010  | 0.010  | 0.0019  | mg/L  |   |   | 1   | 6010B  |
| 7440-09-7 | Potassium | 1.4     | 0.50   | 0.070   | mg/L  |   |   | 1   | 6010B  |
| 7782-49-2 | Selenium  | <0.010  | 0.010  | 0.0027  | mg/L  |   |   | 1   | 6010B  |
| 7440-22-4 | Silver    | <0.0050 | 0.0050 | 0.0011  | mg/L  |   |   | 1   | 6010B  |
| 7440-23-5 | Sodium    | 15      | 1.0    | 0.12    | mg/L  |   |   | 1   | 6010B  |
| 7440-28-0 | Thallium  | <0.010  | 0.010  | 0.0013  | mg/L  |   |   | 1   | 6010B  |
| 7440-62-2 | Vanadium  | <0.0050 | 0.0050 | 0.00062 | mg/L  |   |   | 1   | 6010B  |
| 7440-66-6 | Zinc      | <0.020  | 0.020  | 0.0047  | mg/L  |   |   | 1   | 6010B  |
| 7439-97-6 | Mercury   | <0.20   | 0.20   | 0.070   | ug/L  |   |   | 1   | 7470A  |

025/21/12

LDC #: 27605A4

**VALIDATION COMPLETENESS WORKSHEET**

Date: 5-11-12

SDG #: 500-45457-1

Level III

Page: 1 of 1

Laboratory: Test America, Inc.

m/y.

Reviewer: MG

2nd Reviewer: ✓

**METHOD:** Dissolved Metals (EPA SW 846 Method 6010B/7000) 7470A

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                              |    | Comments                |
|-------|--|----|-------------------------|
| I.    | Technical holding times                      | A  | Sampling dates: 4-10-12 |
| II.   | ICP/MS Tune                                  | N  | not utilized            |
| III.  | Calibration                                  | A  |                         |
| IV.   | Blanks                                       | SW |                         |
| V.    | ICP Interference Check Sample (ICS) Analysis | A  |                         |
| VI.   | Matrix Spike Analysis                        | A  | MS/MSD                  |
| VII.  | Duplicate Sample Analysis                    | A  | DUP                     |
| VIII. | Laboratory Control Samples (LCS)             | A  | LCS                     |
| IX.   | Internal Standard (ICP-MS)                   | N  | not utilized            |
| X.    | Furnace Atomic Absorption QC                 | N  | " "                     |
| XI.   | ICP Serial Dilution                          | A  |                         |
| XII.  | Sample Result Verification                   | N  |                         |
| XIII. | Overall Assessment of Data                   | A  |                         |
| XIV.  | Field Duplicates                             | N  |                         |
| XV.   | Field Blanks                                 | N  |                         |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:  
water

|    |                     |    |     |    |  |    |  |
|----|---------------------|----|-----|----|--|----|--|
| 1  | JP-L3-SW004-0412    | 11 |     | 21 |  | 31 |  |
| 2  | JP-L3-SW004-0412MS  | 12 |     | 22 |  | 32 |  |
| 3  | JP-L3-SW004-0412MSD | 13 |     | 23 |  | 33 |  |
| 4  | JP-L3-SW004-0412DUP | 14 |     | 24 |  | 34 |  |
| 5  |                     | 15 |     | 25 |  | 35 |  |
| 6  |                     | 16 |     | 26 |  | 36 |  |
| 7  |                     | 17 |     | 27 |  | 37 |  |
| 8  |                     | 18 |     | 28 |  | 38 |  |
| 9  |                     | 19 |     | 29 |  | 39 |  |
| 10 |                     | 20 | PBW | 30 |  | 40 |  |

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

LDC #: 27605A4

## VALIDATION FINDINGS WORKSHEET

### Sample Specific Element Reference

Page: 1 of 1

Reviewer: MG

2nd reviewer: \_\_\_\_\_

All circled elements are applicable to each sample.

[illegible]

Comments: Mercury by CVAA if performed

| Analyte | Maximum PB <sup>a</sup> (mg/Kg) | Maximum PB <sup>a</sup> (mg/L) | Maximum ICB/CCB <sup>a</sup> (ug/L) | Action Limit | 1     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---------|---------------------------------|--------------------------------|-------------------------------------|--------------|-------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Ca      |                                 | 0.100                          |                                     | 0.5000       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Cu      |                                 | 0.00556                        |                                     | 0.0278       | 0.018 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Zn      |                                 | 0.00582                        |                                     | 0.0291       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

**Laboratory Data Consultants, Inc.  
Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 12 through April 13, 2012  
**LDC Report Date:** May 16, 2012  
**Matrix:** Water  
**Parameters:** Dissolved Sulfate  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-45457-1

**Sample Identification**

JP-M1-GWMW648-0412  
JP-M1-GWMW998-0412  
JP-M1-GWMW641-0412  
JP-M1-GWMW997-0412  
JP-M1-GWMW642-0412  
JP-M1-GWMW640-0412  
JP-M1-GWMW107-0412  
JP-M1-GWMW231-0412  
JP-M1-GWMW645-0412  
JP-M1-GWMW646  
JP-M1-GWMW649  
JP-M1-GWMW644  
JP-M1-GWMW643  
JP-M1-SW709  
JP-M1-GWMW641-0412MS  
JP-M1-GWMW641-0412MSD

## Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.0 for Dissolved Sulfate.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## **I. Technical Holding Times**

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## **II. Initial Calibration**

All criteria for the initial calibration were met.

## **III. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

## **V. Matrix Spike/Matrix Spike Duplicates**

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## **VI. Duplicates**

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

## **VII. Laboratory Control Samples**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## **VIII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **IX. Overall Assessment of Data**

Data flags are summarized at the end of this report if data has been qualified.

## X. Field Duplicates

Samples JP-M1-GWMW998-0412 and JP-M1-GWMW641-0412 and samples JP-M1-GWMW997-0412 and JP-M1-GWMW642-0412 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

| Analyte | Concentration (mg/L) |                    | RPD<br>(Limits) | Difference<br>(Limits) | Flags | A or P |
|---------|----------------------|--------------------|-----------------|------------------------|-------|--------|
|         | JP-M1-GWMW998-0412   | JP-M1-GWMW641-0412 |                 |                        |       |        |
| Sulfate | 640                  | 640                | 0 ( $\leq 25$ ) | -                      | -     | -      |

| Analyte | Concentration (mg/L) |                    | RPD<br>(Limits) | Difference<br>(Limits) | Flags | A or P |
|---------|----------------------|--------------------|-----------------|------------------------|-------|--------|
|         | JP-M1-GWMW997-0412   | JP-M1-GWMW642-0412 |                 |                        |       |        |
| Sulfate | 420                  | 420                | 0 ( $\leq 25$ ) | -                      | -     | -      |

**JOAAP-GW**

**Dissolved Sulfate - Data Qualification Summary - SDG 500-45457-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Dissolved Sulfate - Laboratory Blank Data Qualification Summary - SDG 500-45457-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Dissolved Sulfate - Field Blank Data Qualification Summary - SDG 500-45457-1**

No Sample Data Qualified in this SDG

1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY - DISSOLVED

Client Sample ID: JP-M1-GWMW648-0412

Lab Sample ID: 500-45457-3

Lab Name: TestAmerica Chicago

Job No.: 500-45457-1

SDG ID.:

Matrix: Water

Date Sampled: 04/12/2012 11:40

Reporting Basis: WET

Date Received: 04/14/2012 07:00

| CAS No.    | Analyte | Result | RL  | MDL  | Units | C | Q | DIL | Method |
|------------|---------|--------|-----|------|-------|---|---|-----|--------|
| 14808-79-8 | Sulfate | 34     | 1.0 | 0.45 | mg/L  |   |   | 5   | 300.0  |

OR 5/21/12

1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY - DISSOLVED

Client Sample ID: JP-M1-GMMW998-0412

Lab Sample ID: 500-45457-4

Lab Name: TestAmerica Chicago

Job No.: 500-45457-1

SDG ID.:

Matrix: Water

Date Sampled: 04/12/2012 12:00

Reporting Basis: WET

Date Received: 04/14/2012 07:00

| CAS No.    | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|------------|---------|--------|----|-----|-------|---|---|-----|--------|
| 14808-79-8 | Sulfate | 640    | 20 | 9.0 | mg/L  |   |   | 100 | 300.0  |

025/2/12

1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY - DISSOLVED

Client Sample ID: JP-M1-GWMW641-0412

Lab Sample ID: 500-45457-5

Lab Name: TestAmerica Chicago

Job No.: 500-45457-1

SDG ID.:

Matrix: Water

Date Sampled: 04/12/2012 12:25

Reporting Basis: WET

Date Received: 04/14/2012 07:00

| CAS No.    | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|------------|---------|--------|----|-----|-------|---|---|-----|--------|
| 14808-79-8 | Sulfate | 640    | 20 | 9.0 | mg/L  |   |   | 100 | 300.0  |

02 skz/12

1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY - DISSOLVED

Client Sample ID: JP-M1-GMMW997-0412

Lab Sample ID: 500-45457-6

Lab Name: TestAmerica Chicago

Job No.: 500-45457-1

SDG ID.:

Matrix: Water

Date Sampled: 04/12/2012 12:45

Reporting Basis: WET

Date Received: 04/14/2012 07:00

| CAS No.    | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|------------|---------|--------|----|-----|-------|---|---|-----|--------|
| 14808-79-8 | Sulfate | 420    | 10 | 4.5 | mg/L  |   |   | 50  | 300.0  |

CRS/2/12

1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY - DISSOLVED

Client Sample ID: JP-M1-GWMW642-0412

Lab Sample ID: 500-45457-7

Lab Name: TestAmerica Chicago

Job No.: 500-45457-1

SDG ID.:

Matrix: Water

Date Sampled: 04/12/2012 12:58

Reporting Basis: WET

Date Received: 04/14/2012 07:00

| CAS No.    | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|------------|---------|--------|----|-----|-------|---|---|-----|--------|
| 14808-79-8 | Sulfate | 420    | 10 | 4.5 | mg/L  |   |   | 50  | 300.0  |

CRS/k/r

1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY - DISSOLVED

Client Sample ID: JP-M1-GMMW640-0412

Lab Sample ID: 500-45457-8

Lab Name: TestAmerica Chicago

Job No.: 500-45457-1

SDG ID.:

Matrix: Water

Date Sampled: 04/12/2012 13:40

Reporting Basis: WET

Date Received: 04/14/2012 07:00

| CAS No.    | Analyte | Result | RL  | MDL | Units | C | Q | DIL  | Method |
|------------|---------|--------|-----|-----|-------|---|---|------|--------|
| 14808-79-8 | Sulfate | 5200   | 200 | 90  | mg/L  |   |   | 1000 | 300.0  |

CR 5/24/12

1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY - DISSOLVED

Client Sample ID: JP-M1-GMMW107-0412

Lab Sample ID: 500-45457-9

Lab Name: TestAmerica Chicago

Job No.: 500-45457-1

SDG ID.:

Matrix: Water

Date Sampled: 04/12/2012 14:25

Reporting Basis: WET

Date Received: 04/14/2012 07:00

| CAS No.    | Analyte | Result | RL   | MDL | Units | C | Q | DIL  | Method |
|------------|---------|--------|------|-----|-------|---|---|------|--------|
| 14808-79-8 | Sulfate | 26000  | 1000 | 450 | mg/L  |   |   | 5000 | 300.0  |

QR 5/21/12

1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY - DISSOLVED

Client Sample ID: JP-M1-GMMW231-0412

Lab Sample ID: 500-45457-10

Lab Name: TestAmerica Chicago

Job No.: 500-45457-1

SDG ID.:

Matrix: Water

Date Sampled: 04/12/2012 15:20

Reporting Basis: WET

Date Received: 04/14/2012 07:00

| CAS No.    | Analyte | Result | RL   | MDL | Units | C | Q | DIL  | Method |
|------------|---------|--------|------|-----|-------|---|---|------|--------|
| 14808-79-8 | Sulfate | 35000  | 1000 | 450 | mg/L  |   |   | 5000 | 300.0  |

CR 5/21/12

1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY - DISSOLVED

Client Sample ID: JP-M1-GMMW645-0412

Lab Sample ID: 500-45457-11

Lab Name: TestAmerica Chicago

Job No.: 500-45457-1

SDG ID.:

Matrix: Water

Date Sampled: 04/13/2012 10:10

Reporting Basis: WET

Date Received: 04/14/2012 07:00

| CAS No.    | Analyte | Result | RL  | MDL | Units | C | Q | DIL | Method |
|------------|---------|--------|-----|-----|-------|---|---|-----|--------|
| 14808-79-8 | Sulfate | 67     | 4.0 | 1.8 | mg/L  |   |   | 20  | 300.0  |

CR 5/21/12

1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY - DISSOLVED

Client Sample ID: JP-M1-GWMW646

Lab Sample ID: 500-45457-12

Lab Name: TestAmerica Chicago

Job No.: 500-45457-1

SDG ID.: \_\_\_\_\_

Matrix: Water

Date Sampled: 04/13/2012 10:50

Reporting Basis: WET

Date Received: 04/14/2012 07:00

| CAS No.    | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|------------|---------|--------|----|-----|-------|---|---|-----|--------|
| 14808-79-8 | Sulfate | 110    | 10 | 4.5 | mg/L  |   |   | 50  | 300.0  |

QR 5/24/12

1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY - DISSOLVED

Client Sample ID: JP-M1-GWMW649

Lab Sample ID: 500-45457-13

Lab Name: TestAmerica Chicago

Job No.: 500-45457-1

SDG ID.:

Matrix: Water

Date Sampled: 04/13/2012 11:40

Reporting Basis: WET

Date Received: 04/14/2012 07:00

| CAS No.    | Analyte | Result | RL  | MDL | Units | C | Q | DIL | Method |
|------------|---------|--------|-----|-----|-------|---|---|-----|--------|
| 14808-79-8 | Sulfate | 64     | 4.0 | 1.8 | mg/L  |   |   | 20  | 300.0  |

OR 5/21/12

1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY - DISSOLVED

Client Sample ID: JP-M1-GMMW644

Lab Sample ID: 500-45457-14

Lab Name: TestAmerica Chicago

Job No.: 500-45457-1

SDG ID.:

Matrix: Water

Date Sampled: 04/13/2012 10:04

Reporting Basis: WET

Date Received: 04/14/2012 07:00

| CAS No.    | Analyte | Result | RL | MDL | Units | C | Q | DIL | Method |
|------------|---------|--------|----|-----|-------|---|---|-----|--------|
| 14808-79-8 | Sulfate | 160    | 10 | 4.5 | mg/L  |   |   | 50  | 300.0  |

CR 5/24/12

1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY - DISSOLVED

Client Sample ID: JP-M1-GMMW643

Lab Sample ID: 500-45457-15

Lab Name: TestAmerica Chicago

Job No.: 500-45457-1

SDG ID.:

Matrix: Water

Date Sampled: 04/13/2012 09:32

Reporting Basis: WET

Date Received: 04/14/2012 07:00

| CAS No.    | Analyte | Result | RL  | MDL | Units | C | Q | DIL | Method |
|------------|---------|--------|-----|-----|-------|---|---|-----|--------|
| 14808-79-8 | Sulfate | 58     | 4.0 | 1.8 | mg/L  |   |   | 20  | 300.0  |

CRS/21/12

1B-IN  
INORGANIC ANALYSIS DATA SHEET  
GENERAL CHEMISTRY - DISSOLVED

Client Sample ID: JP-M1-SW709

Lab Sample ID: 500-45457-19

Lab Name: TestAmerica Chicago

Job No.: 500-45457-1

SDG ID.:

Matrix: Water

Date Sampled: 04/13/2012 10:10

Reporting Basis: WET

Date Received: 04/14/2012 07:00

| CAS No.    | Analyte | Result | RL  | MDL | Units | C | Q | DIL | Method |
|------------|---------|--------|-----|-----|-------|---|---|-----|--------|
| 14808-79-8 | Sulfate | 60     | 4.0 | 1.8 | mg/L  |   |   | 20  | 300.0  |

025/24/12

LDC #: 27605A6

**VALIDATION COMPLETENESS WORKSHEET**

Date: 5-11-12


SDG #: 500-45457-1

Level III

Page: 1 of 1

Laboratory: Test America, Inc.

Reviewer: MG

2nd Reviewer: **METHOD:** Dissolved Sulfate (EPA Method 300.0)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                      |    | Comments                                |
|-------|--------------------------------------|----|---|
| I.    | Technical holding times              | A  | Sampling dates: 4-12-12 through 4-13-12 |
| II.   | Initial calibration                  | A  |   |
| III.  | Calibration verification             | A  |   |
| IV.   | Blanks                               | A  |   |
| V.    | Matrix Spike/Matrix Spike Duplicates | A  | MS/MSD                                  |
| VI.   | Duplicates                           | N  |   |
| VII.  | Laboratory control samples           | A  | LCS                                     |
| VIII. | Sample result verification           | N  |   |
| IX.   | Overall assessment of data           | A  |   |
| X.    | Field duplicates                     | SW | (2,3), (4,5)                            |
| XI.   | Field blanks                         | N  |   |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

oil water

|    |                    |    |                       |    |      |    |  |
|----|--------------------|----|-----------------------|----|------|----|--|
| 1  | JP-M1-GWMW648-0412 | 11 | JP-M1-GWMW649         | 21 |      | 31 |  |
| 2  | JP-M1-GWMW998-0412 | 12 | JP-M1-GWMW644         | 22 |      | 32 |  |
| 3  | JP-M1-GWMW641-0412 | 13 | JP-M1-GWMW643         | 23 |      | 33 |  |
| 4  | JP-M1-GWMW997-0412 | 14 | JP-M1-SW709           | 24 |      | 34 |  |
| 5  | JP-M1-GWMW642-0412 | 15 | JP-M1-GWMW641-0412MS  | 25 |      | 35 |  |
| 6  | JP-M1-GWMW640-0412 | 16 | JP-M1-GWMW641-0412MSD | 26 |      | 36 |  |
| 7  | JP-M1-GWMW107-0412 | 17 |                       | 27 |      | 37 |  |
| 8  | JP-M1-GWMW231-0412 | 18 |                       | 28 |      | 38 |  |
| 9  | JP-M1-GWMW645-0412 | 19 |                       | 29 | PBW1 | 39 |  |
| 10 | JP-M1-GWMW646      | 20 |                       | 30 | PBW2 | 40 |  |

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

LDC#: 27605A6 **VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 1 of 1  
 Reviewer: MG  
 2nd Reviewer: CR

Inorganics, Method See Cover

| Analyte | Concentration (mg/L) |     | RPD ( $\leq 25$ ) | Difference | Limits | Qualification<br>(Parent only) |
|---------|----------------------|-----|-------------------|------------|--------|--------------------------------|
|         | 2                    | 3   |                   |            |        |                                |
| Sulfate | 640                  | 640 | 0                 |            |        |                                |

V:\FIELD DUPLICATES\FD\_inorganic\27605A6.wpd

| Analyte | Concentration (mg/L) |     | RPD ( $\leq 25$ ) | Difference | Limits | Qualification<br>(Parent only) |
|---------|----------------------|-----|-------------------|------------|--------|--------------------------------|
|         | 4                    | 5   |                   |            |        |                                |
| Sulfate | 420                  | 420 | 0                 |            |        |                                |

V:\FIELD DUPLICATES\FD\_inorganic\27605A6.wpd

**Laboratory Data Consultants, Inc.**  
**Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 12 through April 13, 2012  
**LDC Report Date:** May 22, 2012  
**Matrix:** Water  
**Parameters:** Explosives  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-45457-1

**Sample Identification**

JP-L3-SW004-0412  
JP-L1-GWMW131  
JP-L1-GWWES1  
JP-L1-SW550  
JP-OA-GWMW118  
JP-OA-GWMW119  
JP-OA-GWMW117

## Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330 for Explosives.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

Initial calibration of compounds was performed for the primary (quantitation) column and confirmation column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

## III. Continuing Calibration

Continuing calibration was performed at the required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits with the following exceptions:

| Date    | Column  | Compound       | %D   | Associated Samples                              | Flag                                    | A or P |
|---------|---------|----------------|------|---|---|--------|
| 4/18/12 | UC5 ODS | 2-Nitrotoluene | 17.5 | JP-OA-GWMW118<br>JP-OA-GWMW119<br>JP-OA-GWMW117 | J (all detects)<br>UJ (all non-detects) | A      |

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No explosive contaminants were found in the method blanks.

No field blanks were identified in this SDG.

## V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for sample JP-L1-GWMW131. Since the sample was diluted out, no data were qualified.

## VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| LCS ID<br>(Associated<br>Samples)                          | Compound | LCS<br>%R (Limits) | LCSD<br>%R (Limits) | RPD<br>(Limits) | Flag            | A or P |
|--|----------|--------------------|---------------------|-----------------|-----------------|--------|
| LSC/D500-146630/2-A<br>(All samples in SDG<br>500-45457-1) | HMX      | 116 (80-115)       | 121 (80-115)        | -               | J (all detects) | P      |

## VIII. Target Compound Identification

Raw data were not reviewed for this SDG.

## IX. Compound Quantitation and RLs

The sample results for detected compounds from the two columns were within 40% difference with the following exceptions:

| Sample        | Compound  | %D            | Flag                               | A or P |
|---------------|---|---------------|------------------------------------|--------|
| JP-L1-GWMW131 | 1,3-Dinitrobenzene                                  | 130.0         | J (all detects)                    | A      |
| JP-L1-GWWES1  | 1,3,5-Trinitrobenzene<br>4-Amino-2,6-dinitrotoluene | 189.8<br>63.5 | J (all detects)<br>J (all detects) | A      |

Raw data were not reviewed for this SDG.

## X. System Performance

Raw data were not reviewed for this SDG.

## XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XII. Field Duplicates

No field duplicates were identified in this SDG.

**JOAAP-GW****Explosives - Data Qualification Summary - SDG 500-45457-1**

| SDG         | Sample  | Compound  | Flag                                    | A or P | Reason  |
|-------------|---|---|---|--------|---|
| 500-45457-1 | JP-OA-GWMW118<br>JP-OA-GWMW119<br>JP-OA-GWMW117   | 2-Nitrotoluene                                      | J (all detects)<br>UJ (all non-detects) | A      | Continuing calibration (%D)                       |
| 500-45457-1 | JP-L3-SW004-0412<br>JP-L1-GWMW131<br>JP-L1-GWWES1<br>JP-L1-SW550<br>JP-OA-GWMW118<br>JP-OA-GWMW119<br>JP-OA-GWMW117 | HMX   | J (all detects)                         | P      | Laboratory control samples (%R)                   |
| 500-45457-1 | JP-L1-GWMW131   | 1,3-Dinitrobenzene                                  | J (all detects)                         | A      | Compound quantitation and RLs (column difference) |
| 500-45457-1 | JP-L1-GWWES1  | 1,3,5-Trinitrobenzene<br>4-Amino-2,6-dinitrotoluene | J (all detects)<br>J (all detects)      | A      | Compound quantitation and RLs (column difference) |

**JOAAP-GW****Explosives - Laboratory Blank Data Qualification Summary - SDG 500-45457-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Explosives - Field Blank Data Qualification Summary - SDG 500-45457-1**

No Sample Data Qualified in this SDG

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45457-1

Client Sample ID: JP-L3-SW004-0412

Lab Sample ID: 500-45457-2

Date Sampled: 04/12/2012 1030

Client Matrix: Water

Date Received: 04/14/2012 0700

**8330 Nitroaromatics and Nitramines (HPLC)**

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146545 | Instrument ID:         | INST35-36 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146630 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/18/2012 0907 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/17/2012 0940 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         | *         | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 111  |           | 70 - 130          |

*05/22/12*

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45457-1

Client Sample ID: JP-L1-GWMW131

Lab Sample ID: 500-45457-16

Client Matrix: Water

Date Sampled: 04/12/2012 1600

Date Received: 04/14/2012 0700

**8330 Nitroaromatics and Nitramines (HPLC)**

Analysis Method: 8330

Prep Method: 3535

Dilution: 10

Analysis Date: 04/18/2012 0941

Prep Date: 04/17/2012 0940

Analysis Batch: 500-146545

Prep Batch: 500-146630

Instrument ID: INST35-36

Initial Weight/Volume: 770 mL

Final Weight/Volume: 6.0 mL

Injection Volume: 100 µL

Result Type: PRIMARY

| Analyte                    | Result (ug/L) | Qualifier | MDL  | RL  |
|----------------------------|---------------|-----------|------|-----|
| HMX                        | <3.1          |           | 1.2  | 3.1 |
| RDX                        | <1.6          | *         | 0.77 | 1.6 |
| 1,3,5-Trinitrobenzene      | <1.6          |           | 0.39 | 1.6 |
| 1,3-Dinitrobenzene         | 5.4           | J         | 0.33 | 1.6 |
| Nitrobenzene               | <1.6          |           | 0.32 | 1.6 |
| Tetryl                     | <3.9          |           | 0.65 | 3.9 |
| 2,4-Dinitrotoluene         | <3.1          |           | 0.32 | 3.1 |
| 2,6-Dinitrotoluene         | <3.1          |           | 0.71 | 3.1 |
| 2-Amino-4,6-dinitrotoluene | 65            |           | 0.35 | 3.1 |
| 4-Amino-2,6-dinitrotoluene | 70            |           | 0.74 | 3.1 |
| 2-Nitrotoluene             | <3.1          |           | 0.82 | 3.1 |
| 4-Nitrotoluene             | <3.1          |           | 0.82 | 3.1 |
| 3-Nitrotoluene             | <3.1          |           | 1.4  | 3.1 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 296  | X         | 70 - 130          |

*04/21/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45457-1

Client Sample ID: JP-L1-GMMW131

Lab Sample ID: 500-45457-16

Client Matrix: Water

Date Sampled: 04/12/2012 1600

Date Received: 04/14/2012 0700

### 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146545 | Instrument ID:         | INST35-36 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146630 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 500             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/20/2012 0027 | Run Type:       | DL         | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/17/2012 0940 |                 |            | Result Type:           | PRIMARY   |

| Analyte               | Result (ug/L) | Qualifier | MDL | RL |
|-----------------------|---------------|-----------|-----|----|
| 2,4,6-Trinitrotoluene | 2200          |           | 18  | 80 |

*OK 5/22/12*

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45457-1

Client Sample ID: JP-L1-GWWES1

Lab Sample ID: 500-45457-17

Date Sampled: 04/12/2012 1422

Client Matrix: Water

Date Received: 04/14/2012 0700

**8330 Nitroaromatics and Nitramines (HPLC)**

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146545 | Instrument ID:         | INST35-36 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146630 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 10              |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/18/2012 1049 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/17/2012 0940 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL  | RL  |
|----------------------------|---------------|-----------|------|-----|
| HMX                        | <3.1          |           | 1.2  | 3.1 |
| RDX                        | <1.6          | *         | 0.77 | 1.6 |
| 1,3,5-Trinitrobenzene      | 40 J          |           | 0.39 | 1.6 |
| 1,3-Dinitrobenzene         | <1.6          |           | 0.33 | 1.6 |
| Nitrobenzene               | 3.9           |           | 0.32 | 1.6 |
| 2,4,6-Trinitrotoluene      | 38            |           | 0.36 | 1.6 |
| Tetryl                     | <3.9          |           | 0.65 | 3.9 |
| 2,4-Dinitrotoluene         | <3.1          |           | 0.32 | 3.1 |
| 2,6-Dinitrotoluene         | <3.1          |           | 0.71 | 3.1 |
| 2-Amino-4,6-dinitrotoluene | 13            |           | 0.35 | 3.1 |
| 4-Amino-2,6-dinitrotoluene | 21 J          |           | 0.74 | 3.1 |
| 2-Nitrotoluene             | <3.1          |           | 0.82 | 3.1 |
| 4-Nitrotoluene             | <3.1          |           | 0.82 | 3.1 |
| 3-Nitrotoluene             | <3.1          |           | 1.4  | 3.1 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 61   | X         | 70 - 130          |

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45457-1

Client Sample ID: JP-L1-SW550

Lab Sample ID: 500-45457-18

Date Sampled: 04/12/2012 1330

Client Matrix: Water

Date Received: 04/14/2012 0700

**8330 Nitroaromatics and Nitramines (HPLC)**

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146545 | Instrument ID:         | INST35-36 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146630 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/18/2012 1123 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/17/2012 0940 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         | *         | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 107  |           | 70 - 130          |

025/12/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45457-1

Client Sample ID: JP-OA-GMMW118

Lab Sample ID: 500-45457-20

Date Sampled: 04/13/2012 1250

Client Matrix: Water

Date Received: 04/14/2012 0700

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146545 | Instrument ID: INST35-36      |
| Prep Method: 3535              | Prep Batch: 500-146630     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/18/2012 1231 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/17/2012 0940     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L)   | Qualifier | MDL               | RL   |
|----------------------------|-----------------|-----------|-------------------|------|
| HMX                        | <0.31           |           | 0.12              | 0.31 |
| RDX                        | <0.16           | *         | 0.077             | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16           |           | 0.039             | 0.16 |
| 1,3-Dinitrobenzene         | <0.16           |           | 0.033             | 0.16 |
| Nitrobenzene               | <0.16           |           | 0.032             | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16           |           | 0.036             | 0.16 |
| Tetryl                     | <0.39           |           | 0.065             | 0.39 |
| 2,4-Dinitrotoluene         | <0.31           |           | 0.032             | 0.31 |
| 2,6-Dinitrotoluene         | <0.31           |           | 0.071             | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31           |           | 0.035             | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31           |           | 0.074             | 0.31 |
| 2-Nitrotoluene             | <0.31 <i>US</i> |           | 0.082             | 0.31 |
| 4-Nitrotoluene             | <0.31           |           | 0.082             | 0.31 |
| 3-Nitrotoluene             | <0.31           |           | 0.14              | 0.31 |
| Surrogate                  | %Rec            | Qualifier | Acceptance Limits |      |
| 1,2-Dinitrobenzene         | 112             |           | 70 - 130          |      |

*05/03/12*

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45457-1

Client Sample ID: JP-OA-GWMW119

Lab Sample ID: 500-45457-21

Date Sampled: 04/13/2012 1250

Client Matrix: Water

Date Received: 04/14/2012 0700

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146545 | Instrument ID: INST35-36      |
| Prep Method: 3535              | Prep Batch: 500-146630     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/18/2012 1305 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/17/2012 0940     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         | *         | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         | JS        | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 110  |           | 70 - 130          |

025/22/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45457-1

Client Sample ID: JP-OA-GWMW117

Lab Sample ID: 500-45457-22

Date Sampled: 04/13/2012 1200

Client Matrix: Water

Date Received: 04/14/2012 0700

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146545 | Instrument ID: INST35-36      |
| Prep Method: 3535              | Prep Batch: 500-146630     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/18/2012 1339 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/17/2012 0940     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         | *         | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         | US        | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 119  |           | 70 - 130          |

CS/22/12

LDC #: 27605A40

**VALIDATION COMPLETENESS WORKSHEET**

SDG #: 500-45457-1

Level III

Laboratory: Test America, Inc.

Date: 5/15/12

Page: 1 of 1

Reviewer: MA2nd Reviewer: CA**METHOD:** HPLC Explosives (EPA SW 846 Method 8330)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                      |    | Comments                     |
|-------|--------------------------------------|----|------------------------------|
| I.    | Technical holding times              | A  | Sampling dates: 4/12-4/13/12 |
| II.   | Initial calibration                  | A  | % RSD $\leq$ 20%             |
| III.  | Calibration verification/ICV         | SW | % D $\leq$ 15%, ICV/CCV      |
| IV.   | Blanks                               | A  |                              |
| V.    | Surrogate recovery                   | SW |                              |
| VI.   | Matrix spike/Matrix spike duplicates | N  |                              |
| VII.  | Laboratory control samples           | SW | LCS/D                        |
| VIII. | Target compound identification       | N  |                              |
| IX.   | Compound quantitation/RL/LOQ/LODs    | SW |                              |
| X.    | System Performance                   | N  |                              |
| XI.   | Overall assessment of data           | A  |                              |
| XII.  | Field duplicates                     | N  |                              |
| XIII. | Field blanks                         | N  |                              |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples: WATER

|    |                  |    |           |    |  |    |  |
|----|------------------|----|-----------|----|--|----|--|
| 1  | JP-L3-SW004-0412 | 11 | 146630 MB | 21 |  | 31 |  |
| 2  | JP-L1-GWMW131    | 12 |           | 22 |  | 32 |  |
| 3  | JP-L1-GWWES1     | 13 |           | 23 |  | 33 |  |
| 4  | JP-L1-SW550      | 14 |           | 24 |  | 34 |  |
| 5  | JP-OA-GWMW118    | 15 |           | 25 |  | 35 |  |
| 6  | JP-OA-GWMW119    | 16 |           | 26 |  | 36 |  |
| 7  | JP-OA-GWMW117    | 17 |           | 27 |  | 37 |  |
| 8  |                  | 18 |           | 28 |  | 38 |  |
| 9  |                  | 19 |           | 29 |  | 39 |  |
| 10 |                  | 20 |           | 30 |  | 40 |  |

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

# VALIDATION FINDINGS WORKSHEET

METHOD: GC / HPLC

| 8310                      | 8330                          | 8151                 | 8141                | 8141(Con't)           | 8021B             |
|---------------------------|-------------------------------|----------------------|---------------------|-----------------------|-------------------|
| A. Acenaphthene           | A. HMX                        | A. 2,4-D             | A. Dichlorvos       | V. Fensulfothion      | V. Benzene        |
| B. Acenaphthylene         | B. RDX                        | B. 2,4-DB            | B. Mevinphos        | W. Bolstar            | CC. Toluene       |
| C. Anthracene             | C. 1,3,5-Trinitrobenzene      | C. 2,4,5-T           | C. Demeton-O        | X. EPN                | EE. Ethyl Benzene |
| D. Benzo(a)anthracene     | D. 1,3-Dinitrobenzene         | D. 2,4,5-TP          | D. Demeton-S        | Y. Azinphos-methyl    | SSS. O-Xylene     |
| E. Benzo(a)pyrene         | E. Tetrl                      | E. Dinoseb           | E. Ethoprop         | Z. Coumaphos          | RRR. MP-Xylene    |
| F. Benzo(b)fluoranthene   | F. Nitrobenzene               | F. Dichlorprop       | F. Naled            | AA. Parathion         | GG. Total Xylene  |
| G. Benzo(g,h,i)perylene   | G. 2,4,6-Trinitrotoluene      | G. Dicamba           | G. Sulfotep         | BB. Trichloronate     |                   |
| H. Benzo(k)fluoranthene   | H. 4-Amino-2,6-dinitrotoluene | H. Dalapon           | H. Phorate          | CC. Trichlorinate     |                   |
| I. Chrysene               | I. 2-Amino-4,6-dinitrotoluene | I. MCP               | I. Dimethoate       | DD. Trifluralin       |                   |
| J. Dibenz(a,h)anthracene  | J. 2,4-Dinitrotoluene         | J. MCPA              | J. Diazinon         | EE. Def               |                   |
| K. Fluoranthene           | K. 2,6-Dinitrotoluene         | K. Pentachlorophenol | K. Disulfoton       | FF. Prowl             |                   |
| L. Fluorene               | L. 2-Nitrotoluene             | L. 2,4,5-TP (silvex) | L. Parathion-methyl | GG. Ethion            |                   |
| M. Indeno(1,2,3-cd)pyrene | M. 3-Nitrotoluene             | M. Silvex            | M. Ronnel           | HH. Famphur           |                   |
| N. Naphthalene            | N. 4-Nitrotoluene             |                      | N. Malathion        | II. Phosmet           |                   |
| O. Phenanthrene           | O. Nitroglycerin              |                      | O. Chlorpyrifos     | JJ. Tetrachlorvinphos |                   |
| P. Pyrene                 | P.                            |                      | P. Fenthion         | KK. Demeton (total)   |                   |
| Q.                        | Q                             |                      | Q. Parathion-ethyl  |                       |                   |
| R.                        |                               |                      | R. Trichlorinate    |                       |                   |
| S.                        |                               |                      | S. Merphos          |                       |                   |
|                           |                               |                      | T. Stirofos         |                       |                   |
|                           |                               |                      | U. Tokuthion        |                       |                   |

Notes:

## VALIDATION FINDINGS WORKSHEET

### Continuing Calibration

Page: 1 of 1  
 Reviewer: AA  
 2nd Reviewer: q

What type of continuing calibration calculation was performed?        %D or        %R

Were continuing calibration standards analyzed at the required frequencies?

Did the continuing calibration standards meet the %D / %R validation criteria of  $\leq 20.0\%$  / 80-120%?

0

Were the retention times for all calibrated compounds within their respective acceptance windows?

[illegible]

## VALIDATION FINDINGS WORKSHEET

### Surrogate Recovery

LDC #: 27605A-10

METHOD: GC ~~HPLC~~

Are surrogates required by the method? Yes ☒ or No ☐

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
Were surrogates spiked into all samples and blanks? (Y) N N/A

Were surrogates spiked into all samples and blanks? Y N N/A

Did all surrogate recoveries (%R) meet the QC limits?

[illegible]

# VALIDATION FINDINGS WORKSHEET

## Laboratory Control Samples (LCS)

Page: 1 of 1  
Reviewer: AA  
2nd Reviewer: Q

Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG?

Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

|   |   |     |
|---|---|-----|
| Y | N | N/A |
| Y | N | N/A |

Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

[illegible]



**LDC Validation Report #27649**

**(April 2012 Samples)**



## Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437

Web [www.lab-data.com](http://www.lab-data.com)

Fax 760.634.0439

Toltest.  
5201 Jewell Lane  
Poducah KY 42001  
ATTN: Mr. Gary Reside

May 31, 2012

SUBJECT: JOAAP-GW, Data Validation

Dear Mr. Reside,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on May 15, 2012. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 27649:**

| <b><u>SDG #</u></b> | <b><u>Fraction</u></b>                                     |
|---------------------|--|
| 500-45518-1         | Volatiles, Semivolatiles, Dissolved Metals, Wet Chemistry, |
| 500-45519-1         | Explosives   |
| 500-45521-1         |  |

The data validation was performed under EPA Level III guidelines. The analyses were validated using the following documents, as applicable to each method:

- Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan(QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. Rev. 0 July 2009
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1, April 2009
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink  
Project Manager/Chemist

## Attachment 1

[illegible]

## **Laboratory Data Consultants, Inc. Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 16, 2012  
**LDC Report Date:** May 24, 2012  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 500-45518-1

### **Sample Identification**

JP-M13-GWMW808  
JP-M13-GWMW126R  
JP-M13-GWMW362  
JP-M13-GWMW999  
JP-M13-GWMW809  
JP-M13-GWMW806  
JP-M13-GWMW807  
JP-M13-GWMW126RMS  
JP-M13-GWMW126RMSD

## Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds with the following exceptions:

| Date    | Compound         | %D   | Associated Samples             | Flag                                    | A or P |
|---------|------------------|------|--------------------------------|---|--------|
| 4/20/12 | Isopropylbenzene | 20.4 | All samples in SDG 500-45518-1 | J (all detects)<br>UJ (all non-detects) | A      |

All of the continuing calibration relative response factors (RRF) for were within method and validation criteria.

## **V. Blanks**

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

No field blanks were identified in this SDG.

## **VI. Surrogate Spikes**

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## **VII. Matrix Spike/Matrix Spike Duplicates**

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## **VIII. Laboratory Control Samples (LCS)**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## **IX. Regional Quality Assurance and Quality Control**

Not applicable.

## **X. Internal Standards**

All internal standard areas and retention times were within QC limits.

## **XI. Target Compound Identifications**

Raw data were not reviewed for this SDG.

## **XII. Compound Quantitation and RLs**

Raw data were not reviewed for this SDG.

## **XIII. Tentatively Identified Compounds (TICs)**

Raw data were not reviewed for this SDG.

## **XIV. System Performance**

Raw data were not reviewed for this SDG.

## **XV. Overall Assessment of Data**

Data flags are summarized at the end of this report if data has been qualified.

## **XVI. Field Duplicates**

Samples JP-M13-GWMW362 and JP-M13-GWMW999 were identified as field duplicates. No volatiles were detected in any of the samples.

**JOAAP-GW****Volatiles - Data Qualification Summary - SDG 500-45518-1**

| SDG         | Sample  | Compound         | Flag                                    | A or P | Reason                          |
|-------------|---|------------------|---|--------|---------------------------------|
| 500-45518-1 | JP-M13-GWMW808<br>JP-M13-GWMW126R<br>JP-M13-GWMW362<br>JP-M13-GWMW999<br>JP-M13-GWMW809<br>JP-M13-GWMW806<br>JP-M13-GWMW807 | Isopropylbenzene | J (all detects)<br>UJ (all non-detects) | A      | Continuing calibration (ICV %D) |

**JOAAP-GW****Volatiles - Laboratory Blank Data Qualification Summary - SDG 500-45518-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Volatiles - Field Blank Data Qualification Summary - SDG 500-45518-1**

No Sample Data Qualified in this SDG

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-45518-1

Date Sampled: 04/16/2012 1405

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

|                                |                            |                             |
|--------------------------------|----------------------------|-----------------------------|
| Analysis Method: 8260B         | Analysis Batch: 500-147778 | Instrument ID: CMS19        |
| Prep Method: 5030B             | Prep Batch: N/A            | Lab File ID: 45518-01.D     |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 5 mL |
| Analysis Date: 04/27/2012 0151 |                            | Final Weight/Volume: 5 mL   |
| Prep Date: 04/27/2012 0151     |                            |                             |

| Analyte                     | Result (ug/L) | Qualifier | MDL  | RL  |
|-----------------------------|---------------|-----------|------|-----|
| Acetone                     | <5.0          |           | 1.9  | 5.0 |
| Benzene                     | <1.0          |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0          |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0          |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0          |           | 0.23 | 1.0 |
| Bromoform                   | <1.0          |           | 0.45 | 1.0 |
| Bromomethane                | <1.4          |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0          |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0          |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0          |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0          |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0          |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0          |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0          |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0          |           | 0.25 | 1.0 |
| Chloroethane                | <1.4          |           | 0.33 | 1.4 |
| Chloroform                  | <1.0          |           | 0.25 | 1.0 |
| Chloromethane               | <1.0          |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0          |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6          |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0          |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0          |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0          |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0          |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0          |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0          |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0          |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0          |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0          |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0          |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0          |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0          |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0          |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0          |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0          |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0          |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0          |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0          |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0          |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0 JS       |           | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0          |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0          |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0          |           | 0.79 | 5.0 |

05/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-45518-1

Date Sampled: 04/16/2012 1405

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45518-01.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0151

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0151

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0          |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0          |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 91   |           | 75 - 120          |
| Dibromofluoromethane         | 92   |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 95   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 99   |           | 85 - 120          |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-45518-2

Date Sampled: 04/16/2012 1525

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45518-02.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0214

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0214

| Analyte                     | Result (ug/L) | Qualifier | MDL  | RL  |
|-----------------------------|---------------|-----------|------|-----|
| Acetone                     | <5.0          |           | 1.9  | 5.0 |
| Benzene                     | <1.0          |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0          |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0          |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0          |           | 0.23 | 1.0 |
| Bromoform                   | <1.0          |           | 0.45 | 1.0 |
| Bromomethane                | <1.4          |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0          |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0          |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0          |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0          |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0          |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0          |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0          |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0          |           | 0.25 | 1.0 |
| Chloroethane                | <1.4          |           | 0.33 | 1.4 |
| Chloroform                  | <1.0          |           | 0.25 | 1.0 |
| Chloromethane               | <1.0          |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0          |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6          |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0          |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0          |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0          |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0          |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0          |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0          |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0          |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0          |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0          |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0          |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0          |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0          |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0          |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0          |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0          |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0          |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0          |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0          |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0          |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0          | US        | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0          |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0          |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0          |           | 0.79 | 5.0 |

02/25/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-45518-2

Date Sampled: 04/16/2012 1525

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45518-02.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0214

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0214

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0          |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          |           | 0.30 | 1.0 |
| Trichloroethene           | 0.23          | J         | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 86   |           | 75 - 120          |
| Dibromofluoromethane         | 91   |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 93   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 97   |           | 85 - 120          |

05/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-45518-3

Date Sampled: 04/16/2012 1600

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B  
Prep Method: 5030B  
Dilution: 1.0  
Analysis Date: 04/27/2012 0238  
Prep Date: 04/27/2012 0238

Analysis Batch: 500-147778  
Prep Batch: N/A

Instrument ID: CMS19  
Lab File ID: 45518-03.D  
Initial Weight/Volume: 5 mL  
Final Weight/Volume: 5 mL

| Analyte                     | Result (ug/L) | Qualifier | MDL  | RL  |
|-----------------------------|---------------|-----------|------|-----|
| Acetone                     | <5.0          |           | 1.9  | 5.0 |
| Benzene                     | <1.0          |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0          |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0          |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0          |           | 0.23 | 1.0 |
| Bromoform                   | <1.0          |           | 0.45 | 1.0 |
| Bromomethane                | <1.4          |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0          |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0          |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0          |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0          |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0          |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0          |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0          |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0          |           | 0.25 | 1.0 |
| Chloroethane                | <1.4          |           | 0.33 | 1.4 |
| Chloroform                  | <1.0          |           | 0.25 | 1.0 |
| Chloromethane               | <1.0          |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0          |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6          |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0          |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0          |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0          |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0          |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0          |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0          |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0          |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0          |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0          |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0          |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0          |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0          |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0          |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0          |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0          |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0          |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0          |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0          |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0          |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0          | 05        | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0          |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0          |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0          |           | 0.79 | 5.0 |

05/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-45518-3

Date Sampled: 04/16/2012 1600

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45518-03.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0238

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0238

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0          |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0          |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 92   |           | 75 - 120          |
| Dibromofluoromethane         | 98   |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 95   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 105  |           | 85 - 120          |

025/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GMMW999

Lab Sample ID: 500-45518-4

Date Sampled: 04/16/2012 1200

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

|                                |                            |                             |
|--------------------------------|----------------------------|-----------------------------|
| Analysis Method: 8260B         | Analysis Batch: 500-147778 | Instrument ID: CMS19        |
| Prep Method: 5030B             | Prep Batch: N/A            | Lab File ID: 45518-04.D     |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 5 mL |
| Analysis Date: 04/27/2012 0302 |                            | Final Weight/Volume: 5 mL   |
| Prep Date: 04/27/2012 0302     |                            |                             |

| Analyte                     | Result (ug/L) | Qualifier | MDL  | RL  |
|-----------------------------|---------------|-----------|------|-----|
| Acetone                     | <5.0          |           | 1.9  | 5.0 |
| Benzene                     | <1.0          |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0          |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0          |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0          |           | 0.23 | 1.0 |
| Bromoform                   | <1.0          |           | 0.45 | 1.0 |
| Bromomethane                | <1.4          |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0          |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0          |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0          |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0          |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0          |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0          |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0          |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0          |           | 0.25 | 1.0 |
| Chloroethane                | <1.4          |           | 0.33 | 1.4 |
| Chloroform                  | <1.0          |           | 0.25 | 1.0 |
| Chloromethane               | <1.0          |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0          |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6          |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0          |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0          |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0          |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0          |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0          |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0          |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0          |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0          |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0          |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0          |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0          |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0          |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0          |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0          |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0          |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0          |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0          |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0          |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0          |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0          | US        | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0          |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0          |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0          |           | 0.79 | 5.0 |

04/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-45518-4

Date Sampled: 04/16/2012 1200

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45518-04.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0302

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0302

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0          |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0          |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 91   |           | 75 - 120          |
| Dibromofluoromethane         | 93   |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 97   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 98   |           | 85 - 120          |

025/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-45518-5

Date Sampled: 04/16/2012 1327

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45518-05.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0325

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0325

| Analyte                     | Result (ug/L) | Qualifier | MDL  | RL  |
|-----------------------------|---------------|-----------|------|-----|
| Acetone                     | <5.0          |           | 1.9  | 5.0 |
| Benzene                     | <1.0          |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0          |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0          |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0          |           | 0.23 | 1.0 |
| Bromoform                   | <1.0          |           | 0.45 | 1.0 |
| Bromomethane                | <1.4          |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0          |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0          |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0          |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0          |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0          |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0          |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0          |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0          |           | 0.25 | 1.0 |
| Chloroethane                | <1.4          |           | 0.33 | 1.4 |
| Chloroform                  | <1.0          |           | 0.25 | 1.0 |
| Chloromethane               | <1.0          |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0          |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6          |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0          |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0          |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0          |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0          |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0          |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0          |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0          |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0          |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0          |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0          |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0          |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0          |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0          |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0          |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0          |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0          |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0          |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0          |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0          |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0          | 55        | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0          |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0          |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0          |           | 0.79 | 5.0 |

025/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-45518-5

Date Sampled: 04/16/2012 1327

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

|                                |                            |                             |
|--------------------------------|----------------------------|-----------------------------|
| Analysis Method: 8260B         | Analysis Batch: 500-147778 | Instrument ID: CMS19        |
| Prep Method: 5030B             | Prep Batch: N/A            | Lab File ID: 45518-05.D     |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 5 mL |
| Analysis Date: 04/27/2012 0325 |                            | Final Weight/Volume: 5 mL   |
| Prep Date: 04/27/2012 0325     |                            |                             |

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0          |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0          |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 92   |           | 75 - 120          |
| Dibromofluoromethane         | 96   |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 96   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 101  |           | 85 - 120          |

025/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-45518-6

Date Sampled: 04/16/2012 1223

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45518-06.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0349

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0349

| Analyte                     | Result (ug/L)      | Qualifier | MDL  | RL  |
|-----------------------------|--------------------|-----------|------|-----|
| Acetone                     | <5.0               |           | 1.9  | 5.0 |
| Benzene                     | <1.0               |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0               |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0               |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0               |           | 0.23 | 1.0 |
| Bromoform                   | <1.0               |           | 0.45 | 1.0 |
| Bromomethane                | <1.4               |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0               |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0               |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0               |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0               |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0               |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0               |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0               |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0               |           | 0.25 | 1.0 |
| Chloroethane                | <1.4               |           | 0.33 | 1.4 |
| Chloroform                  | <1.0               |           | 0.25 | 1.0 |
| Chloromethane               | <1.0               |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0               |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0               |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0               |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6               |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0               |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0               |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0               |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0               |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0               |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0               |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0               |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0               |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0               |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0               |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0               |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0               |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0               |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0               |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0               |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0               |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0               |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0               |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0               |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0               |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0 <sup>us</sup> |           | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0               |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0               |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0               |           | 0.79 | 5.0 |

025/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-45518-6

Client Matrix: Water

Date Sampled: 04/16/2012 1223

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45518-06.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0349

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0349

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0          |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0          |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 92   |           | 75 - 120          |
| Dibromofluoromethane         | 95   |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 99   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 101  |           | 85 - 120          |

025/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-45518-7

Client Matrix: Water

Date Sampled: 04/16/2012 1127

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45518-07.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0412

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0412

| Analyte                     | Result (ug/L) | Qualifier | MDL  | RL  |
|-----------------------------|---------------|-----------|------|-----|
| Acetone                     | <5.0          |           | 1.9  | 5.0 |
| Benzene                     | <1.0          |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0          |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0          |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0          |           | 0.23 | 1.0 |
| Bromoform                   | <1.0          |           | 0.45 | 1.0 |
| Bromomethane                | <1.4          |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0          |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0          |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0          |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0          |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0          |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0          |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0          |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0          |           | 0.25 | 1.0 |
| Chloroethane                | <1.4          |           | 0.33 | 1.4 |
| Chloroform                  | <1.0          |           | 0.25 | 1.0 |
| Chloromethane               | <1.0          |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0          |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6          |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0          |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0          |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0          |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0          |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0          |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0          |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0          |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0          |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0          |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0          |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0          |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0          |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0          |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0          |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0          |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0          |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0          |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0          |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0          |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0          | JS        | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0          |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0          |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0          |           | 0.79 | 5.0 |

025/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-45518-7

Date Sampled: 04/16/2012 1127

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45518-07.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0412

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0412

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0          |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0          |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 91   |           | 75 - 120          |
| Dibromofluoromethane         | 95   |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 96   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 102  |           | 85 - 120          |

04/30/12

LDC #: 27649A1

## VALIDATION COMPLETENESS WORKSHEET

Date: 5/24/12

SDG #: 500-45518-1

Level III

Page: 1 of 1

Laboratory: Test America, Inc.

Reviewer: R

2nd Reviewer: CR

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                                |    | Comments                |
|-------|--|----|-------------------------|
| I.    | Technical holding times                        | A  | Sampling dates: 4/16/12 |
| II.   | GC/MS Instrument performance check             | A  |                         |
| III.  | Initial calibration                            | A  | %RSD ≤ 30/15            |
| IV.   | Continuing calibration/ICV                     | SW | CV/101 ≤ 20             |
| V.    | Blanks   | A  |                         |
| VI.   | Surrogate spikes                               | A  |                         |
| VII.  | Matrix spike/Matrix spike duplicates           | A  |                         |
| VIII. | Laboratory control samples                     | A  | LCS                     |
| IX.   | Regional Quality Assurance and Quality Control | N  |                         |
| X.    | Internal standards                             | A  |                         |
| XI.   | Target compound identification                 | N  |                         |
| XII.  | Compound quantitation/RL/LOQ/LODs              | N  |                         |
| XIII. | Tentatively identified compounds (TICs)        | N  |                         |
| XIV.  | System performance                             | N  |                         |
| XV.   | Overall assessment of data                     | A  |                         |
| XVI.  | Field duplicates                               | ND | D = 3 + 4               |
| XVII. | Field blanks                                   | N  |                         |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

W

|    |                    |    |               |    |  |    |  |
|----|--------------------|----|---------------|----|--|----|--|
| 1  | JP-M13-GWMW808     | 11 | MB 500-147778 | 21 |  | 31 |  |
| 2  | JP-M13-GWMW126R    | 12 | ↓ 147785      | 22 |  | 32 |  |
| 3  | JP-M13-GWMW362     | 13 |               | 23 |  | 33 |  |
| 4  | JP-M13-GWMW999     | 14 |               | 24 |  | 34 |  |
| 5  | JP-M13-GWMW809     | 15 |               | 25 |  | 35 |  |
| 6  | JP-M13-GWMW806     | 16 |               | 26 |  | 36 |  |
| 7  | JP-M13-GWMW807     | 17 |               | 27 |  | 37 |  |
| 8  | JP-M13-GWMW126RMS  | 18 |               | 28 |  | 38 |  |
| 9  | JP-M13-GWMW126RMSD | 19 |               | 29 |  | 39 |  |
| 10 |                    | 20 |               | 30 |  | 40 |  |

# TARGET COMPOUND WORKSHEET

METHOD: VOA

|                              |                                 |                               |  |                          |
|------------------------------|---------------------------------|-------------------------------|--|--------------------------|
| A. Chloromethane             | U. 1,1,2-Trichloroethane        | OO. 2,2-Dichloropropane       | III. n-Butylbenzene                        | CCCC. 1-Chlorohexane     |
| B. Bromomethane              | V. Benzene                      | PP. Bromochloromethane        | JJJ. 1,2-Dichlorobenzene                   | DDDD. Isopropyl alcohol  |
| C. Vinyl chloride            | W. trans-1,3-Dichloropropene    | QQ. 1,1-Dichloropropene       | KKK. 1,2,4-Trichlorobenzene                | EEEE. Acetonitrile       |
| D. Chloroethane              | X. Bromoform                    | RR. Dibromomethane            | LLL. Hexachlorobutadiene                   | FFFF. Acrolein           |
| E. Methylene chloride        | Y. 4-Methyl-2-pentanone         | SS. 1,3-Dichloropropane       | MMM. Naphthalene                           | GGGG. Acrylonitrile      |
| F. Acetone                   | Z. 2-Hexanone                   | TT. 1,2-Dibromoethane         | NNN. 1,2,3-Trichlorobenzene                | HHHH. 1,4-Dioxane        |
| G. Carbon disulfide          | AA. Tetrachloroethene           | UU. 1,1,1,2-Tetrachloroethane | OOO. 1,3,5-Trichlorobenzene                | IIII. Isobutyl alcohol   |
| H. 1,1-Dichloroethene        | BB. 1,1,2,2-Tetrachloroethane   | VV. Isopropylbenzene          | PPP. trans-1,2-Dichloroethene              | JJJJ. Methacrylonitrile  |
| I. 1,1-Dichloroethane        | CC. Toluene                     | WW. Bromobenzene              | QQQ. cis-1,2-Dichloroethene                | KKKK. Propionitrile      |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene               | XX. 1,2,3-Trichloropropane    | RRR. m,p-Xylenes                           | LLLL. Ethyl ether        |
| K. Chloroform                | EE. Ethylbenzene                | YY. n-Propylbenzene           | SSS. o-Xylene                              | MMMM. Benzyl chloride    |
| L. 1,2-Dichloroethane        | FF. Styrene                     | ZZ. 2-Chlorotoluene           | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. Iodomethane        |
| M. 2-Butanone                | GG. Xylenes, total              | AAA. 1,3,5-Trimethylbenzene   | UUU. 1,2-Dichlorotetrafluoroethane         | OOOO. 1,1-Difluoroethane |
| N. 1,1,1-Trichloroethane     | HH. Vinyl acetate               | BBB. 4-Chlorotoluene          | VVV. 4-Ethyltoluene                        | PPPP.                    |
| O. Carbon tetrachloride      | II. 2-Chloroethylvinyl ether    | CCC. tert-Butylbenzene        | WWW. Ethanol                               | QQQQ.                    |
| P. Bromodichloromethane      | JJ. Dichlorodifluoromethane     | DDD. 1,2,4-Trimethylbenzene   | XXX. Di-isopropyl ether                    | RRRR.                    |
| Q. 1,2-Dichloropropane       | KK. Trichlorofluoromethane      | EEE. sec-Butylbenzene         | YYY. tert-Butanol                          | SSSS.                    |
| R. cis-1,3-Dichloropropene   | LL. Methyl-tert-butyl ether     | FFF. 1,3-Dichlorobenzene      | ZZZ. tert-Butyl alcohol                    | TTTT.                    |
| S. Trichloroethene           | MM. 1,2-Dibromo-3-chloropropane | GGG. p-Isopropyltoluene       | AAAA. Ethyl tert-butyl ether               | UUUU.                    |
| T. Dibromochloromethane      | NN. Methyl ethyl ketone         | HHH. 1,4-Dichlorobenzene      | BBBB. tert-Amyl methyl ether               | VVVV.                    |

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

| Y | N | N/A | Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? |
|---|---|-----|--|
|   |   |     |  |

Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?

| Y/N | N/A |
|-----|-----|
|     |     |

Were all %D and RRFs within the validation criteria of  $\leq 20\%$  D and  $\geq 0.05$  RRF?

[illegible]

**Laboratory Data Consultants, Inc.**  
**Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 16, 2012  
**LDC Report Date:** May 24, 2012  
**Matrix:** Water  
**Parameters:** Semivolatiles  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-45518-1

**Sample Identification**

JP-M13-GWMW808  
JP-M13-GWMW126R  
JP-M13-GWMW362  
JP-M13-GWMW999  
JP-M13-GWMW809  
JP-M13-GWMW806  
JP-M13-GWMW807  
JP-M13-GWMW126RMS  
JP-M13-GWMW126RMSD

## Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals with the following exceptions:

| Sample             | Compound          | Total Time From DFTPP Tuning Until Analysis | Required Analysis Time (in Hours) From DFTPP Tuning Until Analysis | Flag | A or P |
|--------------------|-------------------|---|--|------|--------|
| JP-M13-GWMW126RMS  | All TCL compounds | 12 hrs. 25 min.                             | 12 hrs.  | None | P      |
| JP-M13-GWMW126RMSD | All TCL compounds | 12 hrs. 47 min.                             | 12 hrs.  | None | P      |

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs) with the following exceptions:

| Date   | Compound  | %RSD                                 | Associated Samples                | Flag  | A or P |
|--------|---|--------------------------------------|-----------------------------------|---|--------|
| 5/1/12 | N-Nitrosodimethylamine<br>3&4-Methylphenol<br>Dibenzofuran<br>Di-n-butylphthalate<br>Benzo(k)fluoranthene | 33.0<br>19.0<br>17.0<br>17.0<br>22.0 | All samples in SDG<br>500-45518-1 | J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects) | A      |

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination ( $r^2$ ) were greater than or equal to 0.990 .

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds with the following exceptions:

| Date   | Compound   | %D                   | Associated Samples                | Flag                                    | A or P |
|--------|--|----------------------|-----------------------------------|---|--------|
| 5/1/12 | 2-Methylnaphthalene<br>Dibenzofuran<br>Di-n-butylphthalate | 20.3<br>21.3<br>20.5 | All samples in SDG<br>500-45518-1 | J (all detects)<br>UJ (all non-detects) | A      |

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No semivolatile contaminants were found in the method blanks.

No field blanks were identified in this SDG.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| Spike ID<br>(Associated Samples)           | Compound                               | MS (%R)<br>(Limits) | MSD (%R)<br>(Limits) | RPD<br>(Limits)      | Flag                               | A or P |
|--|--|---------------------|----------------------|----------------------|------------------------------------|--------|
| JP-M13-GWMW126RMS/MSD<br>(JP-M13-GWMW126R) | N-Nitrosodimethylamine<br>Benzoic acid | -<br>-              | -<br>-               | 65 (≤30)<br>32 (≤30) | J (all detects)<br>J (all detects) | A      |

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## **X. Internal Standards**

All internal standard areas and retention times were within QC limits.

## **XI. Target Compound Identifications**

Raw data were not reviewed for this SDG.

## **XII. Compound Quantitation and RLs**

Raw data were not reviewed for this SDG.

## **XIII. Tentatively Identified Compounds (TICs)**

Raw data were not reviewed for this SDG.

## **XIV. System Performance**

Raw data were not reviewed for this SDG.

## **XV. Overall Assessment**

Data flags are summarized at the end of this report if data has been qualified.

## **XVI. Field Duplicates**

Samples JP-M13-GWMW362 and JP-M13-GWMW999 were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

| Compound           | Concentration (ug/L) |                | RPD<br>(Limits) | Difference<br>(Limits) | Flags | A or P |
|--------------------|----------------------|----------------|-----------------|------------------------|-------|--------|
|                    | JP-M13-GWMW362       | JP-M13-GWMW999 |                 |                        |       |        |
| 2,4-Dinitrotoluene | 3.3                  | 2.6            | -               | 0.7 ( $\leq 1.3$ )     | -     | -      |
| 2,6-Dinitrotoluene | 0.25                 | 0.29           | -               | 0.04 ( $\leq 0.47$ )   | -     | -      |

**JOAAP-GW****Semivolatiles - Data Qualification Summary - SDG 500-45518-1**

| SDG         | Sample  | Compound  | Flag  | A or P | Reason                                    |
|-------------|---|---|---|--------|---|
| 500-45518-1 | JP-M13-GWMW808<br>JP-M13-GWMW126R<br>JP-M13-GWMW362<br>JP-M13-GWMW999<br>JP-M13-GWMW809<br>JP-M13-GWMW806<br>JP-M13-GWMW807 | N-Nitrosodimethylamine<br>3&4-Methylphenol<br>Dibenzofuran<br>Di-n-butylphthalate<br>Benzo(k)fluoranthene | J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects) | A      | Initial calibration (%RSD)                |
| 500-45518-1 | JP-M13-GWMW808<br>JP-M13-GWMW126R<br>JP-M13-GWMW362<br>JP-M13-GWMW999<br>JP-M13-GWMW809<br>JP-M13-GWMW806<br>JP-M13-GWMW807 | 2-Methylnaphthalene<br>Dibenzofuran<br>Di-n-butylphthalate  | J (all detects)<br>UJ (all non-detects)   | A      | Continuing calibration (ICV %D)           |
| 500-45518-1 | JP-M13-GWMW126R   | N-Nitrosodimethylamine<br>Benzoic acid  | J (all detects)<br>J (all detects)  | A      | Matrix spike/Matrix spike duplicate (RPD) |

**JOAAP-GW****Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 500-45518-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Semivolatiles - Field Blank Data Qualification Summary - SDG 500-45518-1**

No Sample Data Qualified in this SDG

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-45518-1

Date Sampled: 04/16/2012 1405

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

Analysis Method: 8270C

Analysis Batch: 500-148426

Instrument ID: CMS12

Prep Method: 3510C

Prep Batch: 500-146890

Lab File ID: 45518-1.D

Dilution: 1.0

Initial Weight/Volume: 1070 mL

Analysis Date: 05/02/2012 2103

Final Weight/Volume: 1.0 mL

Prep Date: 04/19/2012 0759

Injection Volume: 1 uL

| Analyte                      | Result (ug/L) | Qualifier | MDL   | RL   |
|------------------------------|---------------|-----------|-------|------|
| Acenaphthene                 | <0.93         |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3          |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93         |           | 0.30  | 0.93 |
| Anthracene                   | <0.93         |           | 0.30  | 0.93 |
| Benzidine                    | <37           |           | 19    | 37   |
| Benzoic acid                 | <19           |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19         |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19         |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23         |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93         |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19         |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19           |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9          |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9          |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9          |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3          |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7          |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9          |           | 0.25  | 1.9  |
| Carbazole                    | <4.7          |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3          |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3          |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9          |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7          |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7          |           | 0.76  | 4.7  |
| Chrysene                     | <0.47         |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28         |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9          |           | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7          |           | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9          |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9          |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9          |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7          |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3          |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9          |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3          |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9          |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19           |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19           |           | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3          |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47         |           | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3          |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93         |           | 0.30  | 0.93 |
| Fluorene                     | <0.93         |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7          |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47         |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7          |           | 1.0   | 4.7  |

02 5/29/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-45518-1

Date Sampled: 04/16/2012 1405

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

|                                |                            |                                |
|--------------------------------|----------------------------|--------------------------------|
| Analysis Method: 8270C         | Analysis Batch: 500-148426 | Instrument ID: CMS12           |
| Prep Method: 3510C             | Prep Batch: 500-146890     | Lab File ID: 45518-1.D         |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 1070 mL |
| Analysis Date: 05/02/2012 2103 |                            | Final Weight/Volume: 1.0 mL    |
| Prep Date: 04/19/2012 0759     |                            | Injection Volume: 1 uL         |

| Analyte                   | Result (ug/L)  | Qualifier | MDL   | RL   |
|---------------------------|----------------|-----------|-------|------|
| Hexachloroethane          | <4.7           |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23          |           | 0.079 | 0.23 |
| Isophorone                | <1.9           |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47 <i>u</i> |           | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9           |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9           |           | 0.41  | 1.9  |
| Naphthalene               | <0.93          |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7           |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3           |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3           |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93          |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3           |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19            |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93          |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47          |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3           |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93          |           | 0.33  | 0.93 |
| Phenol                    | <4.7           |           | 0.34  | 4.7  |
| Pyrene                    | <0.93          |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9           |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3           |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7           |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 32   |           | 20 - 110          |
| Phenol-d5            | 25   |           | 10 - 115          |
| Nitrobenzene-d5      | 63   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 72   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 83   |           | 40 - 125          |
| Terphenyl-d14        | 80   |           | 50 - 135          |

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-45518-2

Date Sampled: 04/16/2012 1525

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

Analysis Method: 8270C

Analysis Batch: 500-148426

Instrument ID: CMS12

Prep Method: 3510C

Prep Batch: 500-146890

Lab File ID: 45518-2.D

Dilution: 1.0

Initial Weight/Volume: 1070 mL

Analysis Date: 05/02/2012 2125

Final Weight/Volume: 1.0 mL

Prep Date: 04/19/2012 0759

Injection Volume: 1 uL

| Analyte                      | Result (ug/L) | Qualifier | MDL   | RL   |
|------------------------------|---------------|-----------|-------|------|
| Acenaphthene                 | <0.93         |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3          |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93         |           | 0.30  | 0.93 |
| Anthracene                   | <0.93         |           | 0.30  | 0.93 |
| Benzidine                    | <37           |           | 19    | 37   |
| Benzoic acid                 | <19           |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19         |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19         |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23         |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93         |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19         |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19           |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9          |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9          |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9          |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3          |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7          |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9          |           | 0.25  | 1.9  |
| Carbazole                    | <4.7          |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3          |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3          |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9          |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7          |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7          |           | 0.76  | 4.7  |
| Chrysene                     | <0.47         |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28         |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9          | SS        | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7          | SS        | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9          |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9          |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9          |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7          |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3          |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9          |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3          |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9          |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19           |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19           |           | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3          |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47         |           | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3          |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93         |           | 0.30  | 0.93 |
| Fluorene                     | <0.93         |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7          |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47         |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7          |           | 1.0   | 4.7  |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-45518-2

Date Sampled: 04/16/2012 1525

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

Analysis Method: 8270C

Analysis Batch: 500-148426

Instrument ID: CMS12

Prep Method: 3510C

Prep Batch: 500-146890

Lab File ID: 45518-2.D

Dilution: 1.0

Initial Weight/Volume: 1070 mL

Analysis Date: 05/02/2012 2125

Final Weight/Volume: 1.0 mL

Prep Date: 04/19/2012 0759

Injection Volume: 1 uL

| Analyte                   | Result (ug/L) | Qualifier | MDL   | RL   |
|---------------------------|---------------|-----------|-------|------|
| Hexachloroethane          | <4.7          |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23         |           | 0.079 | 0.23 |
| Isophorone                | <1.9          |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47         | U         | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9          |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9          |           | 0.41  | 1.9  |
| Naphthalene               | <0.93         |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7          |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3          |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3          |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93         |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3          |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19           |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93         |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47         |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3          |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93         |           | 0.33  | 0.93 |
| Phenol                    | <4.7          |           | 0.34  | 4.7  |
| Pyrene                    | <0.93         |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9          |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3          |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7          |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 30   |           | 20 - 110          |
| Phenol-d5            | 22   |           | 10 - 115          |
| Nitrobenzene-d5      | 55   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 59   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 67   |           | 40 - 125          |
| Terphenyl-d14        | 81   |           | 50 - 135          |

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-45518-3

Client Matrix: Water

Date Sampled: 04/16/2012 1600

Date Received: 04/17/2012 1230

## 8270C SVOC

Analysis Method: 8270C  
 Prep Method: 3510C  
 Dilution: 1.0  
 Analysis Date: 05/02/2012 2148  
 Prep Date: 04/19/2012 0759

Analysis Batch: 500-148426  
 Prep Batch: 500-146890

Instrument ID: CMS12  
 Lab File ID: 45518-3.D  
 Initial Weight/Volume: 1070 mL  
 Final Weight/Volume: 1.0 mL  
 Injection Volume: 1 uL

| Analyte                      | Result (ug/L) | Qualifier | MDL   | RL   |
|------------------------------|---------------|-----------|-------|------|
| Acenaphthene                 | <0.93         |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3          |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93         |           | 0.30  | 0.93 |
| Anthracene                   | <0.93         |           | 0.30  | 0.93 |
| Benzidine                    | <37           |           | 19    | 37   |
| Benzoic acid                 | <19           |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19         |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19         |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23         |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93         |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19         |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19           |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9          |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9          |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9          |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3          |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7          |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9          |           | 0.25  | 1.9  |
| Carbazole                    | <4.7          |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3          |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3          |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9          |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7          |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7          |           | 0.76  | 4.7  |
| Chrysene                     | <0.47         |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28         |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9          |           | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7          |           | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9          |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9          |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9          |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7          |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3          |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9          |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3          |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9          |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19           |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19           |           | 6.9   | 19   |
| 2,4-Dinitrotoluene           | 3.3           |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | 0.25          | J         | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3          |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93         |           | 0.30  | 0.93 |
| Fluorene                     | <0.93         |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7          |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47         |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7          |           | 1.0   | 4.7  |

025/29/12

# Analytical Data

Job Number: 500-45518-1

Client: Toltest Inc.

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-45518-3

Client Matrix: Water

Date Sampled: 04/16/2012 1600

Date Received: 04/17/2012 1230

## 8270C SVOC

Analysis Method: 8270C

Prep Method: 3510C

Dilution: 1.0

Analysis Date: 05/02/2012 2148

Prep Date: 04/19/2012 0759

Analysis Batch: 500-148426

Prep Batch: 500-146890

Instrument ID: CMS12

Lab File ID: 45518-3.D

Initial Weight/Volume: 1070 mL

Final Weight/Volume: 1.0 mL

Injection Volume: 1 uL

| Analyte                   | Result (ug/L) | Qualifier | MDL   | RL   |
|---------------------------|---------------|-----------|-------|------|
| Hexachloroethane          | <4.7          |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23         |           | 0.079 | 0.23 |
| Isophorone                | <1.9          |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47         | JS        | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9          |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9          |           | 0.41  | 1.9  |
| Naphthalene               | <0.93         |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7          |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3          |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3          |           | 3.7   | 9.3  |
| Nitrobenzene              | <9.3          |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3          |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19           |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93         |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47         |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3          |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93         |           | 0.33  | 0.93 |
| Phenol                    | <0.93         |           | 0.34  | 4.7  |
| Pyrene                    | <4.7          |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <0.93         |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <1.9          |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <9.3          |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 27   |           | 20 - 110          |
| Phenol-d5            | 20   |           | 10 - 115          |
| Nitrobenzene-d5      | 52   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 51   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 77   |           | 40 - 125          |
| Terphenyl-d14        | 76   |           | 50 - 135          |

025/29/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-45518-4

Date Sampled: 04/16/2012 1200

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

|                                |                            |                                |
|--------------------------------|----------------------------|--------------------------------|
| Analysis Method: 8270C         | Analysis Batch: 500-148426 | Instrument ID: CMS12           |
| Prep Method: 3510C             | Prep Batch: 500-146890     | Lab File ID: 45518-4.D         |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 1070 mL |
| Analysis Date: 05/02/2012 2211 |                            | Final Weight/Volume: 1.0 mL    |
| Prep Date: 04/19/2012 0759     |                            | Injection Volume: 1 uL         |

| Analyte                      | Result (ug/L) | Qualifier | MDL   | RL   |
|------------------------------|---------------|-----------|-------|------|
| Acenaphthene                 | <0.93         |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3          |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93         |           | 0.30  | 0.93 |
| Anthracene                   | <0.93         |           | 0.30  | 0.93 |
| Benidine                     | <37           |           | 19    | 37   |
| Benzoic acid                 | <19           |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19         |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19         |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23         |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93         |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19         |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19           |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9          |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9          |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9          |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3          |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7          |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9          |           | 0.25  | 1.9  |
| Carbazole                    | <4.7          |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3          |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3          |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9          |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7          |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7          |           | 0.76  | 4.7  |
| Chrysene                     | <0.47         |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28         |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9          | JS        | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7          | JS        | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9          |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9          |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9          |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7          |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3          |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9          |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3          |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9          |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19           |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19           |           | 6.9   | 19   |
| 2,4-Dinitrotoluene           | 2.6           |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | 0.29          | J         | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3          |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93         |           | 0.30  | 0.93 |
| Fluorene                     | <0.93         |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7          |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47         |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7          |           | 1.0   | 4.7  |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-45518-4

Date Sampled: 04/16/2012 1200

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

|                                |                            |                                |
|--------------------------------|----------------------------|--------------------------------|
| Analysis Method: 8270C         | Analysis Batch: 500-148426 | Instrument ID: CMS12           |
| Prep Method: 3510C             | Prep Batch: 500-146890     | Lab File ID: 45518-4.D         |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 1070 mL |
| Analysis Date: 05/02/2012 2211 |                            | Final Weight/Volume: 1.0 mL    |
| Prep Date: 04/19/2012 0759     |                            | Injection Volume: 1 uL         |

| Analyte                   | Result (ug/L)   | Qualifier | MDL   | RL   |
|---------------------------|-----------------|-----------|-------|------|
| Hexachloroethane          | <4.7            |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23           |           | 0.079 | 0.23 |
| Isophorone                | <1.9            |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47 <i>US</i> |           | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9            |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9            |           | 0.41  | 1.9  |
| Naphthalene               | <0.93           |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7            |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3            |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3            |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93           |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3            |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19             |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93           |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47           |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3            |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93           |           | 0.33  | 0.93 |
| Phenol                    | <4.7            |           | 0.34  | 4.7  |
| Pyrene                    | <0.93           |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9            |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3            |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7            |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 29   |           | 20 - 110          |
| Phenol-d5            | 20   |           | 10 - 115          |
| Nitrobenzene-d5      | 53   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 55   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 64   |           | 40 - 125          |
| Terphenyl-d14        | 83   |           | 50 - 135          |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-45518-5

Date Sampled: 04/16/2012 1327

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8270C           | Analysis Batch: | 500-148426 | Instrument ID:         | CMS12     |
| Prep Method:     | 3510C           | Prep Batch:     | 500-146890 | Lab File ID:           | 45518-5.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 1070 mL   |
| Analysis Date:   | 05/02/2012 2234 |                 |            | Final Weight/Volume:   | 1.0 mL    |
| Prep Date:       | 04/19/2012 0759 |                 |            | Injection Volume:      | 1 uL      |

| Analyte                      | Result (ug/L) | Qualifier | MDL   | RL   |
|------------------------------|---------------|-----------|-------|------|
| Acenaphthene                 | <0.93         |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3          |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93         |           | 0.30  | 0.93 |
| Anthracene                   | <0.93         |           | 0.30  | 0.93 |
| Benidine                     | <37           |           | 19    | 37   |
| Benzoic acid                 | <19           |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19         |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19         |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23         |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93         |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19         |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19           |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9          |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9          |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9          |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3          |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7          |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9          |           | 0.25  | 1.9  |
| Carbazole                    | <4.7          |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3          |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3          |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9          |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7          |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7          |           | 0.76  | 4.7  |
| Chrysene                     | <0.47         |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28         |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9          | 55        | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7          | 55        | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9          |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9          |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9          |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7          |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3          |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9          |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3          |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9          |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19           |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19           |           | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3          |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47         |           | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3          |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93         |           | 0.30  | 0.93 |
| Fluorene                     | <0.93         |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7          |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47         |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7          |           | 1.0   | 4.7  |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-45518-5

Date Sampled: 04/16/2012 1327

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8270C           | Analysis Batch: | 500-148426 | Instrument ID:         | CMS12     |
| Prep Method:     | 3510C           | Prep Batch:     | 500-146890 | Lab File ID:           | 45518-5.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 1070 mL   |
| Analysis Date:   | 05/02/2012 2234 |                 |            | Final Weight/Volume:   | 1.0 mL    |
| Prep Date:       | 04/19/2012 0759 |                 |            | Injection Volume:      | 1 uL      |

| Analyte                   | Result (ug/L) | Qualifier | MDL   | RL   |
|---------------------------|---------------|-----------|-------|------|
| Hexachloroethane          | <4.7          |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23         |           | 0.079 | 0.23 |
| Isophorone                | <1.9          |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47         | 5         | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9          |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9          |           | 0.41  | 1.9  |
| Naphthalene               | <0.93         |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7          |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3          |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3          |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93         |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3          |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19           |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93         |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47         |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3          |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93         |           | 0.33  | 0.93 |
| Phenol                    | <4.7          |           | 0.34  | 4.7  |
| Pyrene                    | <0.93         |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9          |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3          |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7          |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 28   |           | 20 - 110          |
| Phenol-d5            | 18   |           | 10 - 115          |
| Nitrobenzene-d5      | 53   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 53   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 60   |           | 40 - 125          |
| Terphenyl-d14        | 75   |           | 50 - 135          |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-45518-6

Date Sampled: 04/16/2012 1223

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

|                                |                            |                                |
|--------------------------------|----------------------------|--------------------------------|
| Analysis Method: 8270C         | Analysis Batch: 500-148426 | Instrument ID: CMS12           |
| Prep Method: 3510C             | Prep Batch: 500-146890     | Lab File ID: 45518-6.D         |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 1070 mL |
| Analysis Date: 05/02/2012 2256 |                            | Final Weight/Volume: 1.0 mL    |
| Prep Date: 04/19/2012 0759     |                            | Injection Volume: 1 uL         |

| Analyte                      | Result (ug/L) | Qualifier | MDL   | RL   |
|------------------------------|---------------|-----------|-------|------|
| Acenaphthene                 | <0.93         |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3          |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93         |           | 0.30  | 0.93 |
| Anthracene                   | <0.93         |           | 0.30  | 0.93 |
| Benzidine                    | <37           |           | 19    | 37   |
| Benzoic acid                 | <19           |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19         |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19         |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23         |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93         |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19         |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19           |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9          |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9          |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9          |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3          |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7          |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9          |           | 0.25  | 1.9  |
| Carbazole                    | <4.7          |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3          |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3          |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9          |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7          |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7          |           | 0.76  | 4.7  |
| Chrysene                     | <0.47         |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28         |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9          | 55        | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7          | 55        | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9          |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9          |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9          |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7          |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3          |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9          |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3          |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9          |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19           |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19           |           | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3          |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47         |           | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3          |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93         |           | 0.30  | 0.93 |
| Fluorene                     | <0.93         |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7          |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47         |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7          |           | 1.0   | 4.7  |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-45518-6

Date Sampled: 04/16/2012 1223

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

|                                |                            |                                |
|--------------------------------|----------------------------|--------------------------------|
| Analysis Method: 8270C         | Analysis Batch: 500-148426 | Instrument ID: CMS12           |
| Prep Method: 3510C             | Prep Batch: 500-146890     | Lab File ID: 45518-6.D         |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 1070 mL |
| Analysis Date: 05/02/2012 2256 |                            | Final Weight/Volume: 1.0 mL    |
| Prep Date: 04/19/2012 0759     |                            | Injection Volume: 1 uL         |

| Analyte                   | Result (ug/L)   | Qualifier | MDL   | RL   |
|---------------------------|-----------------|-----------|-------|------|
| Hexachloroethane          | <4.7            |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23           |           | 0.079 | 0.23 |
| Isophorone                | <1.9            |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47 <i>us</i> |           | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9            |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9            |           | 0.41  | 1.9  |
| Naphthalene               | <0.93           |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7            |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3            |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3            |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93           |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3            |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19             |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93           |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47           |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3            |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93           |           | 0.33  | 0.93 |
| Phenol                    | <4.7            |           | 0.34  | 4.7  |
| Pyrene                    | <0.93           |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9            |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3            |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7            |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 26   |           | 20 - 110          |
| Phenol-d5            | 20   |           | 10 - 115          |
| Nitrobenzene-d5      | 55   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 55   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 66   |           | 40 - 125          |
| Terphenyl-d14        | 77   |           | 50 - 135          |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-45518-7

Date Sampled: 04/16/2012 1127

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

Analysis Method: 8270C

Analysis Batch: 500-148426

Instrument ID: CMS12

Prep Method: 3510C

Prep Batch: 500-146890

Lab File ID: 45518-7.D

Dilution: 1.0

Initial Weight/Volume: 1070 mL

Analysis Date: 05/02/2012 2319

Final Weight/Volume: 1.0 mL

Prep Date: 04/19/2012 0759

Injection Volume: 1 uL

| Analyte                      | Result (ug/L) | Qualifier | MDL   | RL   |
|------------------------------|---------------|-----------|-------|------|
| Acenaphthene                 | <0.93         |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3          |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93         |           | 0.30  | 0.93 |
| Anthracene                   | <0.93         |           | 0.30  | 0.93 |
| Benzidine                    | <37           |           | 19    | 37   |
| Benzoic acid                 | <19           |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19         |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19         |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23         |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93         |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19         |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19           |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9          |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9          |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9          |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3          |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7          |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9          |           | 0.25  | 1.9  |
| Carbazole                    | <4.7          |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3          |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3          |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9          |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7          |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7          |           | 0.76  | 4.7  |
| Chrysene                     | <0.47         |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28         |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9          | 55        | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7          |           | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9          |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9          |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9          |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7          |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3          |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9          |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3          |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9          |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19           |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19           |           | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3          |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47         |           | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3          |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93         |           | 0.30  | 0.93 |
| Fluorene                     | <0.93         |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7          |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47         |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7          |           | 1.0   | 4.7  |

CRS/29/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-45518-7

Date Sampled: 04/16/2012 1127

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8270C           | Analysis Batch: | 500-148426 | Instrument ID:         | CMS12     |
| Prep Method:     | 3510C           | Prep Batch:     | 500-146890 | Lab File ID:           | 45518-7.D |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 1070 mL   |
| Analysis Date:   | 05/02/2012 2319 |                 |            | Final Weight/Volume:   | 1.0 mL    |
| Prep Date:       | 04/19/2012 0759 |                 |            | Injection Volume:      | 1 uL      |

| Analyte                   | Result (ug/L)   | Qualifier | MDL   | RL   |
|---------------------------|-----------------|-----------|-------|------|
| Hexachloroethane          | <4.7            |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23           |           | 0.079 | 0.23 |
| Isophorone                | <1.9            |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47 <i>US</i> |           | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9            |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9            |           | 0.41  | 1.9  |
| Naphthalene               | <0.93           |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7            |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3            |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3            |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93           |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3            |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19             |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93           |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47           |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3            |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93           |           | 0.33  | 0.93 |
| Phenol                    | <4.7            |           | 0.34  | 4.7  |
| Pyrene                    | <0.93           |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9            |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3            |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7            |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 31   |           | 20 - 110          |
| Phenol-d5            | 22   |           | 10 - 115          |
| Nitrobenzene-d5      | 58   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 57   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 70   |           | 40 - 125          |
| Terphenyl-d14        | 78   |           | 50 - 135          |

LDC #: 27649A2

## VALIDATION COMPLETENESS WORKSHEET

SDG #: 500-45518-1

Level III

Laboratory: Test America, Inc.

Date: 5/24/12

Page: 1 of 1

Reviewer: JK2nd Reviewer: ae**METHOD:** GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                                |    | Comments                |
|-------|--|----|-------------------------|
| I.    | Technical holding times                        | A  | Sampling dates: 4/16/12 |
| II.   | GC/MS Instrument performance check             | SW |                         |
| III.  | Initial calibration                            | SW | %RSD = 30/15, 12        |
| IV.   | Continuing calibration/ICV                     | SW | CCV/ICV = 20%           |
| V.    | Blanks   | A  |                         |
| VI.   | Surrogate spikes                               | A  |                         |
| VII.  | Matrix spike/Matrix spike duplicates           | SW |                         |
| VIII. | Laboratory control samples                     | A  | LCS                     |
| IX.   | Regional Quality Assurance and Quality Control | N  |                         |
| X.    | Internal standards                             | A  |                         |
| XI.   | Target compound identification                 | N  |                         |
| XII.  | Compound quantitation/RL/LOQ/LODs              | N  |                         |
| XIII. | Tentatively identified compounds (TICs)        | N  |                         |
| XIV.  | System performance                             | N  |                         |
| XV.   | Overall assessment of data                     | A  |                         |
| XVI.  | Field duplicates                               | SW | D = 3+4                 |
| XVII. | Field blanks                                   | N  |                         |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

W

|    |                    |    |               |    |  |    |  |
|----|--------------------|----|---------------|----|--|----|--|
| 1  | JP-M13-GWMW808     | 11 | MB 500-117778 | 21 |  | 31 |  |
| 2  | JP-M13-GWMW126R    | 12 |               | 22 |  | 32 |  |
| 3  | JP-M13-GWMW362     | 13 |               | 23 |  | 33 |  |
| 4  | JP-M13-GWMW999     | 14 |               | 24 |  | 34 |  |
| 5  | JP-M13-GWMW809     | 15 |               | 25 |  | 35 |  |
| 6  | JP-M13-GWMW806     | 16 |               | 26 |  | 36 |  |
| 7  | JP-M13-GWMW807     | 17 |               | 27 |  | 37 |  |
| 8  | JP-M13-GWMW126RMS  | 18 |               | 28 |  | 38 |  |
| 9  | JP-M13-GWMW126RMSD | 19 |               | 29 |  | 39 |  |
| 10 |                    | 20 |               | 30 |  | 40 |  |

# VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS BNA

|                                 |                              |                                 |                                  |                                 |
|---------------------------------|------------------------------|---------------------------------|----------------------------------|---------------------------------|
| A. Phenol                       | S. Naphthalene               | KK. 2,4-Dinitrotoluene          | CCC. Benzo(a)anthracene          | UUU. Benzo(b)thiophene          |
| B. Bis (2-chloroethyl) ether    | T. 4-Chloroaniline           | LL. Diethylphthalate            | DDD. Chrysene                    | VVV. Naphthobenzothiophene      |
| C. 2-Chlorophenol               | U. Hexachlorobutadiene       | MM. 4-Chlorophenyl-phenyl ether | EEE. Bis(2-ethylhexyl)phthalate  | WWW. Benzo(e)pyrene             |
| D. 1,3-Dichlorobenzene          | V. 4-Chloro-3-methylphenol   | NN. Fluorene                    | FFF. Di-n-octylphthalate         | XXX. 2,6-Dimethylnaphthalene    |
| E. 1,4-Dichlorobenzene          | W. 2-Methylnaphthalene       | OO. 4-Nitroaniline              | GGG. Benzo(b)fluoranthene        | YYY. 2,3,5-Trimethylnaphthalene |
| F. 1,2-Dichlorobenzene          | X. Hexachlorocyclopentadiene | PP. 4,6-Dinitro-2-methylphenol  | HHH. Benzo(k)fluoranthene        | ZZZ. Perylene                   |
| G. 2-Methylphenol               | Y. 2,4,6-Trichlorophenol     | QQ. N-Nitrosodiphenylamine (1)  | III. Benzo(a)pyrene              | AAA. Dibenzothiophene           |
| H. 2,2'-Oxybis(1-chloropropane) | Z. 2,4,5-Trichlorophenol     | RR. 4-Bromophenyl-phenylether   | JJJ. Indeno(1,2,3-cd)pyrene      | BBB. Benzo(a)fluoranthene       |
| I. 4-Methylphenol               | AA. 2-Chloronaphthalene      | SS. Hexachlorobenzene           | KKK. Dibenz(a,n)anthracene       | CCC. Benzo(b)fluorene           |
| J. N-Nitroso-di-n-propylamine   | BB. 2-Nitroaniline           | TT. Pentachlorophenol           | LLL. Benzo(g,h,i)perylene        | DDD. cis/trans-Decalin          |
| K. Hexachloroethane             | CC. Dimethylphthalate        | UU. Phenanthrene                | MMM. Bis(2-Chloroisopropyl)ether | EEE. Biphenyl                   |
| L. Nitrobenzene                 | DD. Acenaphthylene           | VV. Anthracene                  | NNN. Aniline                     | FFF. Retene                     |
| M. Isopharone                   | EE. 2,6-Dinitrotoluene       | WW. Carbazole                   | OOO. N-Nitrosodimethylamine      | GGG. C30-Hopane                 |
| N. 2-Nitrophenol                | FF. 3-Nitroaniline           | XX. Di-n-butylphthalate         | PPP. Benzoic Acid                | HHH. 1-Methylphenanthrene       |
| O. 2,4-Dimethylphenol           | GG. Acenaphthene             | YY. Fluoranthene                | QQQ. Benzyl alcohol              | III. 2-Naphthylamine            |
| P. Bis(2-chloroethoxy)methane   | HH. 2,4-Dinitrophenol        | ZZ. Pyrene                      | RRR. Pyridine                    | JJJ. 1,4-Dioxane                |
| Q. 2,4-Dichlorophenol           | II. 4-Nitrophenol            | AAA. Butylbenzylphthalate       | SSS. Benzidine                   | KKK.                            |
| R. 1,2,4-Trichlorobenzene       | JJ. Dibenzofuran             | BBB. 3,3'-Dichlorobenzidine     | TTT. 1-Methylnaphthalene         | LLL.                            |



## VALIDATION FINDINGS WORKSHEET

### Initial Calibration

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Did the laboratory conduct an acceptable 5 point calibration prior to sample analysis?

| Y/N | N/A | Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? |
|-----|-----|---|
| Y   | N/A |   |

| Y/N | N/A | Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? |
|-----|-----|--|
| Y   | N/A |  |

|   |         |
|---|---------|
| Did the initial calibration meet the acceptance criteria? | Y N N/A |
|---|---------|

| Q | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Q11 | Q12 | Q13 | Q14 | Q15 | Q16 | Q17 | Q18 | Q19 | Q20 | Q21 | Q22 | Q23 | Q24 | Q25 | Q26 | Q27 | Q28 | Q29 | Q30 | Q31 | Q32 | Q33 | Q34 | Q35 | Q36 | Q37 | Q38 | Q39 | Q40 | Q41 | Q42 | Q43 | Q44 | Q45 | Q46 | Q47 | Q48 | Q49 | Q50 | Q51 | Q52 | Q53 | Q54 | Q55 | Q56 | Q57 | Q58 | Q59 | Q60 | Q61 | Q62 | Q63 | Q64 | Q65 | Q66 | Q67 | Q68 | Q69 | Q70 | Q71 | Q72 | Q73 | Q74 | Q75 | Q76 | Q77 | Q78 | Q79 | Q80 | Q81 | Q82 | Q83 | Q84 | Q85 | Q86 | Q87 | Q88 | Q89 | Q90 | Q91 | Q92 | Q93 | Q94 | Q95 | Q96 | Q97 | Q98 | Q99 | Q100 |
|---|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| 1 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  | 24  | 25  | 26  | 27  | 28  | 29  | 30  | 31  | 32  | 33  | 34  | 35  | 36  | 37  | 38  | 39  | 40  | 41  | 42  | 43  | 44  | 45  | 46  | 47  | 48  | 49  | 50  | 51  | 52  | 53  | 54  | 55  | 56  | 57  | 58  | 59  | 60  | 61  | 62  | 63  | 64  | 65  | 66  | 67  | 68  | 69  | 70  | 71  | 72  | 73  | 74  | 75  | 76  | 77  | 78  | 79  | 80  | 81  | 82  | 83  | 84  | 85  | 86  | 87  | 88  | 89  | 90  | 91  | 92  | 93  | 94  | 95  | 96  | 97  | 98  | 99  | 100 |      |

[illegible]

## VALIDATION FINDINGS WORKSHEET

### Continuing Calibration

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

| Y | N | N/A | Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument? |
|---|---|-----|---|
|   |   |     |   |

Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?

$Y(N)$  N/A

[illegible]

**METHOD: GC/MS BNA**

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

YN N/A

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

Y N/A

Was a MS/MSD analyzed every 20 samples of each matrix?

Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

[illegible]

LDC#: 27649A2**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**Page: 1 of 1  
Reviewer: [Signature]  
2nd Reviewer: [Signature]**METHOD:** GC/MS SVOA

| Compound | Concentration (ug/L) |      | RPD | (ug/L)     | (ug/L)          |         |
|----------|----------------------|------|-----|------------|-----------------|---------|
|          | 3                    | 4    |     | Difference | Limits          |         |
| KK       | 3.3                  | 2.6  |     | 0.7        | ( $\leq 1.3$ )  | No qual |
| EE       | 0.25                 | 0.29 |     | 0.04       | ( $\leq 0.47$ ) | ↓       |

V:\FIELD DUPLICATES\27649A2.wpd

## **Laboratory Data Consultants, Inc. Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 16, 2012  
**LDC Report Date:** May 18, 2012  
**Matrix:** Water  
**Parameters:** Dissolved Metals  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-45518-1

### **Sample Identification**

JP-M13-GWMW808  
JP-M13-GWMW126R  
JP-M13-GWMW362  
JP-M13-GWMW999  
JP-M13-GWMW809  
JP-M13-GWMW806  
JP-M13-GWMW807  
JP-M13-GWMW126RMS  
JP-M13-GWMW126RMSD  
JP-M13-GWMW126RDUP

## Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B and 7470A for Dissolved Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Potassium, Selenium, Sodium, Thallium, Vanadium, and Zinc.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. ICPMS Tune

ICP-MS was not utilized in this SDG.

## III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No dissolved metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike/(Matrix Spike) Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| Spike ID<br>(Associated<br>Samples)                       | Analyte                        | MS (%R)<br>(Limits) | MSD (%R)<br>(Limits)                      | RPD<br>(Limits) | Flag                                    | A or P |
|---|--------------------------------|---------------------|---|-----------------|---|--------|
| JP-M13-GWMW126RMS/MSD<br>(All samples in SDG 500-45518-1) | Magnesium<br>Sodium<br>Mercury | -                   | 70 (80-120)<br>76 (80-120)<br>77 (80-120) | -               | J (all detects)<br>UJ (all non-detects) | A      |

## VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Internal Standards (ICP-MS)

ICP-MS was not utilized in this SDG.

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

## XII. Sample Result Verification

Raw data were not reviewed for this SDG.

## XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIV. Field Duplicates

Samples JP-M13-GWMW362 and JP-M13-GWMW999 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

| Analyte   | Concentration (mg/L) |                | RPD<br>(Limits) | Difference<br>(Limits)    | Flags | A or P |
|-----------|----------------------|----------------|-----------------|---------------------------|-------|--------|
|           | JP-M13-GWMW362       | JP-M13-GWMW999 |                 |                           |       |        |
| Aluminum  | 0.034                | 0.20U          | -               | 0.166 ( $\leq 0.40$ )     | -     | -      |
| Barium    | 0.041                | 0.042          | -               | 0.001 ( $\leq 0.020$ )    | -     | -      |
| Cadmium   | 0.00098              | 0.0010         | -               | 0.00002 ( $\leq 0.0040$ ) | -     | -      |
| Calcium   | 150                  | 150            | 0               | -                         | -     | -      |
| Iron      | 0.14                 | 0.38           | -               | 0.24 ( $\leq 0.40$ )      | -     | -      |
| Magnesium | 89                   | 93             | 4               | -                         | -     | -      |
| Manganese | 0.078                | 0.078          | 0               | -                         | -     | -      |

| Analyte   | Concentration (mg/L) |                | RPD<br>(Limits) | Difference<br>(Limits)  | Flags | A or P |
|-----------|----------------------|----------------|-----------------|-------------------------|-------|--------|
|           | JP-M13-GWMW362       | JP-M13-GWMW999 |                 |                         |       |        |
| Nickel    | 0.0042               | 0.0063         | -               | 0.0021 ( $\leq 0.020$ ) | -     | -      |
| Potassium | 5.8                  | 6.0            | 3               | -                       | -     | -      |
| Sodium    | 200                  | 210            | 5               | -                       | -     | -      |
| Zinc      | 0.020U               | 0.011          | -               | 0.009 ( $\leq 0.040$ )  | -     | -      |

**JOAAP-GW****Dissolved Metals - Data Qualification Summary - SDG 500-45518-1**

| <b>SDG</b>  | <b>Sample</b>   | <b>Analyte</b>                 | <b>Flag</b>                             | <b>A or P</b> | <b>Reason</b>                               |
|-------------|---|--------------------------------|---|---------------|---|
| 500-45518-1 | JP-M13-GWMW808<br>JP-M13-GWMW126R<br>JP-M13-GWMW362<br>JP-M13-GWMW999<br>JP-M13-GWMW809<br>JP-M13-GWMW806<br>JP-M13-GWMW807 | Magnesium<br>Sodium<br>Mercury | J (all detects)<br>UJ (all non-detects) | A             | Matrix spike/Matrix spike<br>duplicate (%R) |

**JOAAP-GW****Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 500-45518-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Dissolved Metals - Field Blank Data Qualification Summary - SDG 500-45518-1**

No Sample Data Qualified in this SDG

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-45518-1

Date Sampled: 04/16/2012 1405

Client Matrix: Water

Date Received: 04/17/2012 1230

**6010B Metals (ICP)-Dissolved**

Analysis Method: 6010B

Analysis Batch: 500-147970

Instrument ID: ICP6

Prep Method: 3010A

Prep Batch: 500-147886

Lab File ID: P6042712C.asc

Dilution: 1.0

Initial Weight/Volume: 50 mL

Analysis Date: 04/28/2012 0032

Final Weight/Volume: 50 mL

Prep Date: 04/27/2012 0930

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | <0.20         |           | 0.025   | 0.20   |
| Antimony  | <0.020        |           | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.14          |           | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | 0.00081       | J         | 0.00054 | 0.0020 |
| Calcium   | 100           |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | 0.016         |           | 0.0010  | 0.0050 |
| Copper    | 0.0011        | J         | 0.0011  | 0.010  |
| Iron      | 2.6           |           | 0.070   | 0.20   |
| Lead      | <0.0050       |           | 0.0016  | 0.0050 |
| Magnesium | 59 JS         |           | 0.024   | 0.10   |
| Manganese | 0.89          |           | 0.0011  | 0.010  |
| Nickel    | 0.026         |           | 0.0019  | 0.010  |
| Potassium | 8.3           |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Sodium    | 56 JS         |           | 0.12    | 1.0    |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | <0.0050       |           | 0.00062 | 0.0050 |
| Zinc      | 0.0069        | J         | 0.0047  | 0.020  |

**7470A Mercury (CVAA)-Dissolved**

Analysis Method: 7470A

Analysis Batch: 500-147745

Instrument ID: HG6

Prep Method: 7470A

Prep Batch: 500-147564

Lab File ID: 042612R.CSV

Dilution: 1.0

Initial Weight/Volume: 25 mL

Analysis Date: 04/26/2012 1058

Final Weight/Volume: 25 mL

Prep Date: 04/25/2012 1000

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20 US      |           | 0.070 | 0.20 |

025/24/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-45518-2

Date Sampled: 04/16/2012 1525

Client Matrix: Water

Date Received: 04/17/2012 1230

**6010B Metals (ICP)-Dissolved**

Analysis Method: 6010B  
Prep Method: 3010A  
Dilution: 1.0  
Analysis Date: 04/28/2012 0036  
Prep Date: 04/27/2012 0930

Analysis Batch: 500-147970  
Prep Batch: 500-147886

Instrument ID: ICP6  
Lab File ID: P6042712C.asc  
Initial Weight/Volume: 50 mL  
Final Weight/Volume: 50 mL

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | <0.20         |           | 0.025   | 0.20   |
| Antimony  | <0.020        |           | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.048         |           | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | 0.00078       | J         | 0.00054 | 0.0020 |
| Calcium   | 61            |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | <0.010        |           | 0.0011  | 0.010  |
| Iron      | <0.20         |           | 0.070   | 0.20   |
| Lead      | <0.0050       |           | 0.0016  | 0.0050 |
| Magnesium | 39            |           | 0.024   | 0.10   |
| Manganese | 0.0032        | J         | 0.0011  | 0.010  |
| Nickel    | 0.0022        | J         | 0.0019  | 0.010  |
| Potassium | 2.0           |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Sodium    | 25            |           | 0.12    | 1.0    |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | <0.0050       |           | 0.00062 | 0.0050 |
| Zinc      | 0.0090        | J         | 0.0047  | 0.020  |

**7470A Mercury (CVAA)-Dissolved**

Analysis Method: 7470A  
Prep Method: 7470A  
Dilution: 1.0  
Analysis Date: 04/26/2012 1105  
Prep Date: 04/25/2012 1000

Analysis Batch: 500-147745  
Prep Batch: 500-147564

Instrument ID: HG6  
Lab File ID: 042612R.CSV  
Initial Weight/Volume: 25 mL  
Final Weight/Volume: 25 mL

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         |           | 0.070 | 0.20 |

025/24/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-45518-3

Date Sampled: 04/16/2012 1600

Client Matrix: Water

Date Received: 04/17/2012 1230

**6010B Metals (ICP)-Dissolved**

|                  |                 |                 |            |                        |               |
|------------------|-----------------|-----------------|------------|------------------------|---------------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-147970 | Instrument ID:         | ICP6          |
| Prep Method:     | 3010A           | Prep Batch:     | 500-147886 | Lab File ID:           | P6042712C.asc |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 50 mL         |
| Analysis Date:   | 04/28/2012 0109 |                 |            | Final Weight/Volume:   | 50 mL         |
| Prep Date:       | 04/27/2012 0930 |                 |            |                        |               |

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | 0.034         | J         | 0.025   | 0.20   |
| Antimony  | <0.020        |           | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.041         |           | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | 0.00098       | J         | 0.00054 | 0.0020 |
| Calcium   | 150           |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | <0.010        |           | 0.0011  | 0.010  |
| Iron      | 0.14          | J         | 0.070   | 0.20   |
| Lead      | <0.0050       |           | 0.0016  | 0.0050 |
| Magnesium | 89            |           | 0.024   | 0.10   |
| Manganese | 0.078         |           | 0.0011  | 0.010  |
| Nickel    | 0.0042        | J         | 0.0019  | 0.010  |
| Potassium | 5.8           |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Sodium    | 200           |           | 0.12    | 1.0    |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | <0.0050       |           | 0.00062 | 0.0050 |
| Zinc      | <0.020        |           | 0.0047  | 0.020  |

**7470A Mercury (CVAA)-Dissolved**

|                  |                 |                 |            |                        |             |
|------------------|-----------------|-----------------|------------|------------------------|-------------|
| Analysis Method: | 7470A           | Analysis Batch: | 500-147745 | Instrument ID:         | HG6         |
| Prep Method:     | 7470A           | Prep Batch:     | 500-147564 | Lab File ID:           | 042612R.CSV |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 25 mL       |
| Analysis Date:   | 04/26/2012 1112 |                 |            | Final Weight/Volume:   | 25 mL       |
| Prep Date:       | 04/25/2012 1000 |                 |            |                        |             |

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         |           | 0.070 | 0.20 |

05/24/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-45518-4

Date Sampled: 04/16/2012 1200

Client Matrix: Water

Date Received: 04/17/2012 1230

**6010B Metals (ICP)-Dissolved**

Analysis Method: 6010B  
Prep Method: 3010A  
Dilution: 1.0  
Analysis Date: 04/28/2012 0116  
Prep Date: 04/27/2012 0930

Analysis Batch: 500-147970  
Prep Batch: 500-147886

Instrument ID: ICP6  
Lab File ID: P6042712C.asc  
Initial Weight/Volume: 50 mL  
Final Weight/Volume: 50 mL

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | <0.20         |           | 0.025   | 0.20   |
| Antimony  | <0.020        |           | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.042         |           | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | 0.0010        | J         | 0.00054 | 0.0020 |
| Calcium   | 150           |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | <0.010        |           | 0.0011  | 0.010  |
| Iron      | 0.38          |           | 0.070   | 0.20   |
| Lead      | <0.0050       |           | 0.0016  | 0.0050 |
| Magnesium | 93 JS         |           | 0.024   | 0.10   |
| Manganese | 0.078         |           | 0.0011  | 0.010  |
| Nickel    | 0.0063        | J         | 0.0019  | 0.010  |
| Potassium | 6.0           |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Sodium    | 210 JS        |           | 0.12    | 1.0    |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | <0.0050       |           | 0.00062 | 0.0050 |
| Zinc      | 0.011         | J         | 0.0047  | 0.020  |

**7470A Mercury (CVAA)-Dissolved**

Analysis Method: 7470A  
Prep Method: 7470A  
Dilution: 1.0  
Analysis Date: 04/26/2012 1114  
Prep Date: 04/25/2012 1000

Analysis Batch: 500-147745  
Prep Batch: 500-147564

Instrument ID: HG6  
Lab File ID: 042612R.CSV  
Initial Weight/Volume: 25 mL  
Final Weight/Volume: 25 mL

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20 JS      |           | 0.070 | 0.20 |

CR5/24/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-45518-5

Date Sampled: 04/16/2012 1327

Client Matrix: Water

Date Received: 04/17/2012 1230

**6010B Metals (ICP)-Dissolved**

Analysis Method: 6010B

Analysis Batch: 500-147970

Instrument ID: ICP6

Prep Method: 3010A

Prep Batch: 500-147886

Lab File ID: P6042712C.asc

Dilution: 1.0

Initial Weight/Volume: 50 mL

Analysis Date: 04/28/2012 0123

Final Weight/Volume: 50 mL

Prep Date: 04/27/2012 0930

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | 0.028         | J         | 0.025   | 0.20   |
| Antimony  | <0.020        |           | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.028         |           | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | 0.00065       | J         | 0.00054 | 0.0020 |
| Calcium   | 38            |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | <0.010        |           | 0.0011  | 0.010  |
| Iron      | 0.094         | J         | 0.070   | 0.20   |
| Lead      | <0.0050       |           | 0.0016  | 0.0050 |
| Magnesium | 29 J          |           | 0.024   | 0.10   |
| Manganese | 0.0024        | J         | 0.0011  | 0.010  |
| Nickel    | 0.0044        | J         | 0.0019  | 0.010  |
| Potassium | 2.4           |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Sodium    | 19 J          |           | 0.12    | 1.0    |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | <0.0050       |           | 0.00062 | 0.0050 |
| Zinc      | 0.0073        | J         | 0.0047  | 0.020  |

**7470A Mercury (CVAA)-Dissolved**

Analysis Method: 7470A

Analysis Batch: 500-147745

Instrument ID: HG6

Prep Method: 7470A

Prep Batch: 500-147564

Lab File ID: 042612R.CSV

Dilution: 1.0

Initial Weight/Volume: 25 mL

Analysis Date: 04/26/2012 1116

Final Weight/Volume: 25 mL

Prep Date: 04/25/2012 1000

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20 JJ      |           | 0.070 | 0.20 |

CR5/24/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-45518-6

Date Sampled: 04/16/2012 1223

Client Matrix: Water

Date Received: 04/17/2012 1230

**6010B Metals (ICP)-Dissolved**

|                  |                 |                 |            |                        |               |
|------------------|-----------------|-----------------|------------|------------------------|---------------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-147970 | Instrument ID:         | ICP6          |
| Prep Method:     | 3010A           | Prep Batch:     | 500-147886 | Lab File ID:           | P6042712C.asc |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 50 mL         |
| Analysis Date:   | 04/28/2012 0127 |                 |            | Final Weight/Volume:   | 50 mL         |
| Prep Date:       | 04/27/2012 0930 |                 |            |                        |               |

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | <0.20         |           | 0.025   | 0.20   |
| Antimony  | <0.020        |           | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.082         |           | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | 0.00068       | J         | 0.00054 | 0.0020 |
| Calcium   | 68            |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | <0.010        |           | 0.0011  | 0.010  |
| Iron      | <0.20         |           | 0.070   | 0.20   |
| Lead      | <0.0050       |           | 0.0016  | 0.0050 |
| Magnesium | 40            | J         | 0.024   | 0.10   |
| Manganese | 0.0024        | J         | 0.0011  | 0.010  |
| Nickel    | <0.010        |           | 0.0019  | 0.010  |
| Potassium | 1.6           |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Sodium    | 22            | J         | 0.12    | 1.0    |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | <0.0050       |           | 0.00062 | 0.0050 |
| Zinc      | 0.013         | J         | 0.0047  | 0.020  |

**7470A Mercury (CVAA)-Dissolved**

|                  |                 |                 |            |                        |             |
|------------------|-----------------|-----------------|------------|------------------------|-------------|
| Analysis Method: | 7470A           | Analysis Batch: | 500-147745 | Instrument ID:         | HG6         |
| Prep Method:     | 7470A           | Prep Batch:     | 500-147564 | Lab File ID:           | 042612R.CSV |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 25 mL       |
| Analysis Date:   | 04/26/2012 1117 |                 |            | Final Weight/Volume:   | 25 mL       |
| Prep Date:       | 04/25/2012 1000 |                 |            |                        |             |

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         | J         | 0.070 | 0.20 |

CR5/24/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-45518-7

Date Sampled: 04/16/2012 1127

Client Matrix: Water

Date Received: 04/17/2012 1230

**6010B Metals (ICP)-Dissolved**

Analysis Method: 6010B

Analysis Batch: 500-147970

Instrument ID: ICP6

Prep Method: 3010A

Prep Batch: 500-147886

Lab File ID: P6042712C.asc

Dilution: 1.0

Initial Weight/Volume: 50 mL

Analysis Date: 04/28/2012 0131

Final Weight/Volume: 50 mL

Prep Date: 04/27/2012 0930

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | <0.20         |           | 0.025   | 0.20   |
| Antimony  | <0.020        |           | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.088         |           | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | 0.00098       | J         | 0.00054 | 0.0020 |
| Calcium   | 160           |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | <0.010        |           | 0.0011  | 0.010  |
| Iron      | 0.59          |           | 0.070   | 0.20   |
| Lead      | <0.0050       |           | 0.0016  | 0.0050 |
| Magnesium | 79 J          |           | 0.024   | 0.10   |
| Manganese | 0.11          |           | 0.0011  | 0.010  |
| Nickel    | 0.0025        | J         | 0.0019  | 0.010  |
| Potassium | 7.2           |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Sodium    | 380 J         |           | 0.12    | 1.0    |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | <0.0050       |           | 0.00062 | 0.0050 |
| Zinc      | 0.0095        | J         | 0.0047  | 0.020  |

**7470A Mercury (CVAA)-Dissolved**

Analysis Method: 7470A

Analysis Batch: 500-147745

Instrument ID: HG6

Prep Method: 7470A

Prep Batch: 500-147564

Lab File ID: 042612R.CSV

Dilution: 1.0

Initial Weight/Volume: 25 mL

Analysis Date: 04/26/2012 1119

Final Weight/Volume: 25 mL

Prep Date: 04/25/2012 1000

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20 JJ      |           | 0.070 | 0.20 |

04/25/12

LDC #: 27649A4

## VALIDATION COMPLETENESS WORKSHEET

Date: 5-17-12

SDG #: 500-45518-1


Level III

Page: 1 of 1

Laboratory: Test America, Inc.

9m4

Reviewer: MG

2nd Reviewer: 

METHOD: Dissolved Metals (EPA SW 846 Method 6010B/7000) 7470A

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                              |    | Comments                |
|-------|--|----|-------------------------|
| I.    | Technical holding times                      | A  | Sampling dates: 4-16-12 |
| II.   | ICP/MS Tune                                  | N  | not utilized            |
| III.  | Calibration                                  | A  |                         |
| IV.   | Blanks                                       | A  |                         |
| V.    | ICP Interference Check Sample (ICS) Analysis | A  |                         |
| VI.   | Matrix Spike Analysis                        | SW | MS/MSD                  |
| VII.  | Duplicate Sample Analysis                    | A  | DUP                     |
| VIII. | Laboratory Control Samples (LCS)             | A  | LCS                     |
| IX.   | Internal Standard (ICP-MS)                   | N  | not utilized            |
| X.    | Furnace Atomic Absorption QC                 | N  | " "                     |
| XI.   | ICP Serial Dilution                          | A  |                         |
| XII.  | Sample Result Verification                   | N  |                         |
| XIII. | Overall Assessment of Data                   | A  |                         |
| XIV.  | Field Duplicates                             | SW | D = 3 + 4               |
| XV.   | Field Blanks                                 | N  |                         |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

all water

|    |                    |    |     |    |  |    |  |
|----|--------------------|----|-----|----|--|----|--|
| 1  | JP-M13-GWMW808     | 11 |     | 21 |  | 31 |  |
| 2  | JP-M13-GWMW126R    | 12 |     | 22 |  | 32 |  |
| 3  | JP-M13-GWMW362     | 13 |     | 23 |  | 33 |  |
| 4  | JP-M13-GWMW999     | 14 |     | 24 |  | 34 |  |
| 5  | JP-M13-GWMW809     | 15 |     | 25 |  | 35 |  |
| 6  | JP-M13-GWMW806     | 16 |     | 26 |  | 36 |  |
| 7  | JP-M13-GWMW807     | 17 |     | 27 |  | 37 |  |
| 8  | JP-M13-GWMW126RMS  | 18 |     | 28 |  | 38 |  |
| 9  | JP-M13-GWMW126RMSD | 19 |     | 29 |  | 39 |  |
| 10 | JP-M13-GWMW126RDUP | 20 | PBW | 30 |  | 40 |  |

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_


LDC #: 27649A4

## VALIDATION FINDINGS WORKSHEET

### Sample Specific Element Reference

Page: 1 of 1

Reviewer: MG

2nd reviewer: 

All circled elements are applicable to each sample.

[illegible]

Comments: Mercury by CVAA if performed

## VALIDATION FINDINGS WORKSHEET

### Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1  
 Reviewer: MG  
 2nd Reviewer: U

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

|     |     |  |
|-----|-----|--|
| Y/N | N/A | Was a matrix spike analyzed for each matrix in this SDG? |
|-----|-----|--|

Were matrix spike percent recoveries (%R) within the control limits of 75-125%? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Were all duplicate sample relative differences (RPD)  $\leq 20\%$  for water samples and  $\leq 35\%$  for soil samples?

☒ Y ☐ N ☐ N/A

**LEVEL IV ONLY:**

Y N N/A

[illegible]

Comments:

LDC#: 27649A4**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**Page: 1 of 1  
Reviewer: MG  
2nd Reviewer: L**METHOD:** Metals (EPA Method 6010B/6020/7000)Y N NA

Were field duplicate pairs identified in this SDG?

Y N NA

Were target analytes detected in the field duplicate pairs?

| Analyte   | Concentration (mg/L) |        | (≤25) | (mg/L)     | (mg/L)    | Qualifications<br>(Parent Only) |
|-----------|----------------------|--------|-------|------------|-----------|---------------------------------|
|           | 3                    | 4      | RPD   | Difference | Limits    |                                 |
| Aluminum  | 0.034                | 0.20U  |       | 0.166      | (≤0.40)   |                                 |
| Barium    | 0.041                | 0.042  |       | 0.001      | (≤0.020)  |                                 |
| Cadmium   | 0.00098              | 0.0010 |       | 0.00002    | (≤0.0040) |                                 |
| Calcium   | 150                  | 150    | 0     |            |           |                                 |
| Iron      | 0.14                 | 0.38   |       | 0.24       | (≤0.40)   |                                 |
| Magnesium | 89                   | 93     | 4     |            |           |                                 |
| Manganese | 0.078                | 0.078  | 0     |            |           |                                 |
| Nickel    | 0.0042               | 0.0063 |       | 0.0021     | (≤0.020)  |                                 |
| Potassium | 5.8                  | 6.0    | 3     |            |           |                                 |
| Sodium    | 200                  | 210    | 5     |            |           |                                 |
| Zinc      | 0.020U               | 0.011  |       | 0.009      | (≤0.040)  |                                 |

V:\FIELD DUPLICATES\FD\_inorganic\27649A4.wpd

**Laboratory Data Consultants, Inc.  
Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 16 2012  
**LDC Report Date:** May 23, 2012  
**Matrix:** Water  
**Parameters:** Wet Chemistry  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-45518-1

**Sample Identification**

JP-M13-GWMW808  
JP-M13-GWMW126R  
JP-M13-GWMW362  
JP-M13-GWMW999  
JP-M13-GWMW809  
JP-M13-GWMW806  
JP-M13-GWMW807  
JP-M13-GWMW126RMS  
JP-M13-GWMW126RMSD

## Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.0 for Dissolved Sulfate and Dissolved Nitrate as Nitrogen.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met with the following exceptions:

| Sample         | Analyte      | Total Time From Sample Collection Until Analysis | Required Holding Time From Sample Collection Until Analysis | Flag                                    | A or P |
|----------------|--------------|--|---|---|--------|
| JP-M13-GWMW999 | Nitrate as N | 52.00 hours                                      | 48 hours  | J (all detects)<br>UJ (all non-detects) | P      |
| JP-M13-GWMW809 | Nitrate as N | 50.75 hours                                      | 48 hours  | J (all detects)<br>UJ (all non-detects) | P      |
| JP-M13-GWMW806 | Nitrate as N | 52.25 hours                                      | 48 hours  | J (all detects)<br>UJ (all non-detects) | P      |
| JP-M13-GWMW807 | Nitrate as N | 54.00 hours                                      | 48 hours  | J (all detects)<br>UJ (all non-detects) | P      |

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

All criteria for the initial calibration were met.

## III. Calibration Verification

Calibration verification frequency and analysis criteria were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

## V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VI. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

## VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

## IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## X. Field Duplicates

Samples JP-M13-GWMW362 and JP-M13-GWMW999 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

| Analyte | Concentration (mg/L) |                | RPD<br>(Limits) | Difference<br>(Limits) | Flags | A or P |
|---------|----------------------|----------------|-----------------|------------------------|-------|--------|
|         | JP-M13-GWMW362       | JP-M13-GWMW999 |                 |                        |       |        |
| Sulfate | 270                  | 270            | 0 (≤25)         | -                      | -     | -      |

**JOAAP-GW****Dissolved Sulfate - Data Qualification Summary - SDG 500-45518-1**

| SDG         | Sample   | Analyte      | Flag                                    | A or P | Reason                  |
|-------------|--|--------------|---|--------|-------------------------|
| 500-45518-1 | JP-M13-GWMW999<br>JP-M13-GWMW809<br>JP-M13-GWMW806<br>JP-M13-GWMW807 | Nitrate as N | J (all detects)<br>UJ (all non-detects) | P      | Technical holding times |

**JOAAP-GW****Dissolved Sulfate - Laboratory Blank Data Qualification Summary - SDG 500-45518-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Dissolved Sulfate - Field Blank Data Qualification Summary - SDG 500-45518-1**

No Sample Data Qualified in this SDG

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

---

### General Chemistry

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-45518-1

Client Matrix: Water

Date Sampled: 04/16/2012 1405

Date Received: 04/17/2012 1230

| Analyte   | Result | Qual | Units | MDL   | RL   | Dil | Method |
|---|--------|------|-------|-------|------|-----|--------|
| Nitrate as N-Dissolved                                    | <0.10  |      | mg/L  | 0.023 | 0.10 | 1.0 | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/18/2012 1256 |        |      |       |       |      |     |        |
| Sulfate-Dissolved   | 88     |      | mg/L  | 0.90  | 2.0  | 10  | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/18/2012 1311 |        |      |       |       |      |     |        |

CRS/24/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

---

### General Chemistry

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-45518-2

Client Matrix: Water

Date Sampled: 04/16/2012 1525

Date Received: 04/17/2012 1230

| Analyte   | Result | Qual | Units | MDL   | RL   | Dil | Method |
|---|--------|------|-------|-------|------|-----|--------|
| Nitrate as N-Dissolved                                    | 0.13   |      | mg/L  | 0.023 | 0.10 | 1.0 | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/18/2012 1325 |        |      |       |       |      |     |        |
| Sulfate-Dissolved   | 52     |      | mg/L  | 0.90  | 2.0  | 10  | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/18/2012 1339 |        |      |       |       |      |     |        |

CRS/24/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

---

### General Chemistry

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-45518-3

Client Matrix: Water

Date Sampled: 04/16/2012 1600

Date Received: 04/17/2012 1230

| Analyte                | Result                     | Qual                      | Units | MDL  | RL  | Dil | Method |
|------------------------|----------------------------|---------------------------|-------|------|-----|-----|--------|
| Nitrate as N-Dissolved | <1.0                       |                           | mg/L  | 0.23 | 1.0 | 10  | 300.0  |
|                        | Analysis Batch: 500-146885 | Analysis Date: 04/18/2012 | 1505  |      |     |     |        |
| Sulfate-Dissolved      | 270                        |                           | mg/L  | 4.5  | 10  | 50  | 300.0  |
|                        | Analysis Batch: 500-146885 | Analysis Date: 04/19/2012 | 0358  |      |     |     |        |

QR5/24/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

---

### General Chemistry

Client Sample ID: JP-M13-GWMW999

Lab Sample ID: 500-45518-4

Client Matrix: Water

Date Sampled: 04/16/2012 1200

Date Received: 04/17/2012 1230

| Analyte   | Result         | Qual | Units | MDL  | RL  | Dil | Method |
|---|----------------|------|-------|------|-----|-----|--------|
| Nitrate as N-Dissolved                                    | <1.0 <i>JS</i> | H    | mg/L  | 0.23 | 1.0 | 10  | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/18/2012 1603 |                |      |       |      |     |     |        |
| Sulfate-Dissolved   | 270            |      | mg/L  | 4.5  | 10  | 50  | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/19/2012 0413 |                |      |       |      |     |     |        |

*QRS/24/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

---

### General Chemistry


Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-45518-5

Date Sampled: 04/16/2012 1327

Client Matrix: Water

Date Received: 04/17/2012 1230

| Analyte   | Result   | Qual | Units | MDL   | RL   | Dil | Method |
|---|--|------|-------|-------|------|-----|--------|
| Nitrate as N-Dissolved                                    | 0.13  | H    | mg/L  | 0.023 | 0.10 | 1.0 | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/18/2012 1617 |  |      |       |       |      |     |        |
| Sulfate-Dissolved   | 5.4  |      | mg/L  | 0.090 | 0.20 | 1.0 | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/18/2012 1617 |  |      |       |       |      |     |        |

OR 5/24/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

---

### General Chemistry

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-45518-6

Date Sampled: 04/16/2012 1223

Client Matrix: Water

Date Received: 04/17/2012 1230

| Analyte   | Result | Qual | Units | MDL   | RL   | Dil | Method |
|---|--------|------|-------|-------|------|-----|--------|
| Nitrate as N-Dissolved                                    | 0.39   | H    | mg/L  | 0.023 | 0.10 | 1.0 | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/18/2012 1645 |        |      |       |       |      |     |        |
| Sulfate-Dissolved   | 80     |      | mg/L  | 0.90  | 2.0  | 10  | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/18/2012 1700 |        |      |       |       |      |     |        |

025/24/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

---

### General Chemistry

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-45518-7

Date Sampled: 04/16/2012 1127

Client Matrix: Water


Date Received: 04/17/2012 1230

| Analyte   | Result         | Qual | Units | MDL  | RL  | Dil | Method |
|---|----------------|------|-------|------|-----|-----|--------|
| Nitrate as N-Dissolved                                    | <1.0 <i>05</i> | H    | mg/L  | 0.23 | 1.0 | 10  | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/18/2012 1728 |                |      |       |      |     |     |        |
| Sulfate-Dissolved   | 230            |      | mg/L  | 4.5  | 10  | 50  | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/19/2012 0427 |                |      |       |      |     |     |        |

*025/24/12*

LDC #: 27649A6  
SDG #: 500-45518-1  
Laboratory: Test America, Inc.

# **VALIDATION COMPLETENESS WORKSHEET** Level III

Date: 5-17-12  
Page: 1 of 1  
Reviewer: MG  
2nd Reviewer: 

**METHOD:** Dissolved Nitrate-N, Dissolved Sulfate (EPA Method 300.0)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                      |    | Comments                |
|-------|--------------------------------------|----|-------------------------|
| I.    | Technical holding times              | SW | Sampling dates: 4-16-12 |
| II.   | Initial calibration                  | A  |                         |
| III.  | Calibration verification             | A  |                         |
| IV.   | Blanks                               | A  |                         |
| V.    | Matrix Spike/Matrix Spike Duplicates | A  | MS/MSD                  |
| VI.   | Duplicates                           | N  |                         |
| VII.  | Laboratory control samples           | A  | LCS                     |
| VIII. | Sample result verification           | N  |                         |
| IX.   | Overall assessment of data           | A  |                         |
| X.    | Field duplicates                     | SW | D = 3 + 4               |
| XI.   | Field blanks                         | N  |                         |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:  
all water

|    |                    |    |     |    |  |    |  |
|----|--------------------|----|-----|----|--|----|--|
| 1  | JP-M13-GWMW808     | 11 |     | 21 |  | 31 |  |
| 2  | JP-M13-GWMW126R    | 12 |     | 22 |  | 32 |  |
| 3  | JP-M13-GWMW362     | 13 |     | 23 |  | 33 |  |
| 4  | JP-M13-GWMW999     | 14 |     | 24 |  | 34 |  |
| 5  | JP-M13-GWMW809     | 15 |     | 25 |  | 35 |  |
| 6  | JP-M13-GWMW806     | 16 |     | 26 |  | 36 |  |
| 7  | JP-M13-GWMW807     | 17 |     | 27 |  | 37 |  |
| 8  | JP-M13-GWMW126RMS  | 18 |     | 28 |  | 38 |  |
| 9  | JP-M13-GWMW126RMSD | 19 |     | 29 |  | 39 |  |
| 10 |                    | 20 | PBW | 30 |  | 40 |  |

Notes: ICAL, ICV, CCV, ICB, CCB reported in "B", SDG: 500-45519-1

LDC #: 27649A6

## VALIDATION FINDINGS WORKSHEET

### Sample Specific Analysis Reference

Page: 1 of 1

Reviewer: MG

2nd reviewer: W

All circled methods are applicable to each sample.

[illegible]

Comments: \_\_\_\_\_

All circled dates have exceeded the technical holding time.

Y N N/A Were all samples preserved as applicable to each method ?

**Y N N/A** Were all cooler temperatures within validation criteria?

[illegible]

LDC#: 27649A6**VALIDATION FINDINGS WORKSHEET**Page: 1 of 1**Field Duplicates**Reviewer: MG2nd Reviewer: ✓Inorganics, Method 300.0

| Analyte | Concentration (mg/L) |     | RPD ( $\leq 25$ ) | Difference | Limits | Qualification<br>(Parent only) |
|---------|----------------------|-----|-------------------|------------|--------|--------------------------------|
|         | 3                    | 4   |                   |            |        |                                |
| Sulfate | 270                  | 270 | 0                 |            |        |                                |

V:\FIELD DUPLICATES\FD\_inorganic\27649A6.wpd

## **Laboratory Data Consultants, Inc. Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 16, 2012  
**LDC Report Date:** May 25, 2012  
**Matrix:** Water  
**Parameters:** Explosives  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-45518-1

### **Sample Identification**

JP-M13-GWMW808  
JP-M13-GWMW126R  
JP-M13-GWMW362  
JP-M13-GWMW999  
JP-M13-GWMW809  
JP-M13-GWMW806  
JP-M13-GWMW807  
JP-M13-GWMW126RMS  
JP-M13-GWMW126RMSD

## Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330 for Explosives.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

Initial calibration of compounds was performed for the primary (quantitation) column and confirmation column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

## III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits with the following exceptions:

| Date    | Column | Compound              | %D   | Associated Samples | Flag                                    | A or P |
|---------|--------|-----------------------|------|--------------------|---|--------|
| 4/20/12 | L3uPH  | 2,4,6-Trinitrotoluene | 16.6 | JP-M13-GWMW807     | J (all detects)<br>UJ (all non-detects) | A      |

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No explosive contaminants were found in the method blanks.

No field blanks were identified in this SDG.

## V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## VIII. Target Compound Identification

Raw data were not reviewed for this SDG.

## IX. Compound Quantitation and RLs

The sample results for detected compounds from the two columns were within 40% difference with the following exceptions:

| Sample         | Compound       | %D   | Flag            | A or P |
|----------------|----------------|------|-----------------|--------|
| JP-M13-GWMW362 | 2-Nitrotoluene | 79.0 | J (all detects) | A      |

Raw data were not reviewed for this SDG.

## X. System Performance

Raw data were not reviewed for this SDG.

## XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XII. Field Duplicates

Samples JP-M13-GWMW362 and JP-M13-GWMW999 were identified as field duplicates. No explosives were detected in any of the samples with the following exceptions:

| Compound                   | Concentration (ug/L) |                | RPD<br>(Limits)  | Difference<br>(Limits) | Flags           | A or P |
|----------------------------|----------------------|----------------|------------------|------------------------|-----------------|--------|
|                            | JP-M13-GWMW362       | JP-M13-GWMW999 |                  |                        |                 |        |
| 2,4,6-Trinitrotoluene      | 0.073                | 0.097          | -                | 0.024 ( $\leq 0.80$ )  | -               | -      |
| 2,4-Dinitrotoluene         | 4.9                  | 5.4            | 10 ( $\leq 25$ ) | -                      | -               | -      |
| 2-Amino-4,6-dinitrotoluene | 1.2                  | 1.2            | -                | 0 ( $\leq 1.55$ )      | -               | -      |
| 4-Amino-2,6-dinitrotoluene | 1.1                  | 1.0            | -                | 0.1 ( $\leq 1.55$ )    | -               | -      |
| 2-Nitrotoluene             | 0.24                 | 2.0            | -                | 1.76 ( $\leq 0.80$ )   | J (all detects) | A      |

| Compound       | Concentration (ug/L) |                | RPD<br>(Limits) | Difference<br>(Limits) | Flags                                   | A or P |
|----------------|----------------------|----------------|-----------------|------------------------|---|--------|
|                | JP-M13-GWMW362       | JP-M13-GWMW999 |                 |                        |   |        |
| 4-Nitrotoluene | 0.31U                | 1.9            | -               | 1.59 ( $\leq 0.80$ )   | J (all detects)<br>UJ (all non-detects) | A      |
| 3-Nitrotoluene | 0.31U                | 0.19           | -               | 0.12 ( $\leq 0.80$ )   | -                                       | -      |

**JOAAP-GW****Explosives - Data Qualification Summary - SDG 500-45518-1**

| SDG         | Sample                           | Compound              | Flag                                    | A or P | Reason                             |
|-------------|----------------------------------|-----------------------|---|--------|------------------------------------|
| 500-45518-1 | JP-M13-GWMW807                   | 2,4,6-Trinitrotoluene | J (all detects)<br>UJ (all non-detects) | A      | Continuing calibration (%D)        |
| 500-45518-1 | JP-M13-GWMW362                   | 2-Nitrotoluene        | J (all detects)                         | A      | Compound quantitation and RLs (%D) |
| 500-45518-1 | JP-M13-GWMW362<br>JP-M13-GWMW999 | 2-Nitrotoluene        | J (all detects)                         | A      | Field duplicates (difference)      |
| 500-45518-1 | JP-M13-GWMW362<br>JP-M13-GWMW999 | 4-Nitrotoluene        | J (all detects)<br>UJ (all non-detects) | A      | Field duplicates (difference)      |

**JOAAP-GW****Explosives - Laboratory Blank Data Qualification Summary - SDG 500-45518-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Explosives - Field Blank Data Qualification Summary - SDG 500-45518-1**

No Sample Data Qualified in this SDG

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW808

Lab Sample ID: 500-45518-1

Date Sampled: 04/16/2012 1405

Client Matrix: Water

Date Received: 04/17/2012 1230

**8330 Nitroaromatics and Nitramines (HPLC)**

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146863 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-147010 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/20/2012 1413 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/19/2012 2030 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 98   |           | 70 - 130          |

025/30/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW126R

Lab Sample ID: 500-45518-2

Date Sampled: 04/16/2012 1525

Client Matrix: Water

Date Received: 04/17/2012 1230

**8330 Nitroaromatics and Nitramines (HPLC)**

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146863 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-147010 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/20/2012 1505 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/19/2012 2030 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | 0.35          |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | 0.30          | J         | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 112  |           | 70 - 130          |

025/30/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW362

Lab Sample ID: 500-45518-3

Date Sampled: 04/16/2012 1600

Client Matrix: Water

Date Received: 04/17/2012 1230

**8330 Nitroaromatics and Nitramines (HPLC)**

Analysis Method: 8330

Analysis Batch: 500-146863

Instrument ID: INST39-40

Prep Method: 3535

Prep Batch: 500-147010

Initial Weight/Volume: 770 mL

Dilution: 1.0

Final Weight/Volume: 6.0 mL

Analysis Date: 04/20/2012 1740

Injection Volume: 100 uL

Prep Date: 04/19/2012 2030

Result Type: PRIMARY

| Analyte                    | Result (ug/L)  | Qualifier | MDL               | RL   |
|----------------------------|----------------|-----------|-------------------|------|
| HMX                        | <0.31          |           | 0.12              | 0.31 |
| RDX                        | <0.16          |           | 0.077             | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16          |           | 0.039             | 0.16 |
| 1,3-Dinitrobenzene         | <0.16          |           | 0.033             | 0.16 |
| Nitrobenzene               | <0.16          |           | 0.032             | 0.16 |
| 2,4,6-Trinitrotoluene      | 0.073          | J         | 0.036             | 0.16 |
| Tetryl                     | <0.39          |           | 0.065             | 0.39 |
| 2,4-Dinitrotoluene         | 4.9            |           | 0.032             | 0.31 |
| 2,6-Dinitrotoluene         | <0.31          |           | 0.071             | 0.31 |
| 2-Amino-4,6-dinitrotoluene | 1.2            |           | 0.035             | 0.31 |
| 4-Amino-2,6-dinitrotoluene | 1.1            |           | 0.074             | 0.31 |
| 2-Nitrotoluene             | 0.24 <i>S</i>  | J         | 0.082             | 0.31 |
| 4-Nitrotoluene             | <0.31 <i>S</i> |           | 0.082             | 0.31 |
| 3-Nitrotoluene             | <0.31          |           | 0.14              | 0.31 |
| Surrogate                  | %Rec           | Qualifier | Acceptance Limits |      |
| 1,2-Dinitrobenzene         | 105            |           | 70 - 130          |      |

*025/30/12*

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GMMW999

Lab Sample ID: 500-45518-4

Date Sampled: 04/16/2012 1200

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146863 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-147010     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/20/2012 1831 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/19/2012 2030     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL               | RL   |
|----------------------------|---------------|-----------|-------------------|------|
| HMX                        | <0.31         |           | 0.12              | 0.31 |
| RDX                        | <0.16         |           | 0.077             | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039             | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033             | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032             | 0.16 |
| 2,4,6-Trinitrotoluene      | 0.097         | J         | 0.036             | 0.16 |
| Tetryl                     | <0.39         |           | 0.065             | 0.39 |
| 2,4-Dinitrotoluene         | 5.4           |           | 0.032             | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071             | 0.31 |
| 2-Amino-4,6-dinitrotoluene | 1.2           |           | 0.035             | 0.31 |
| 4-Amino-2,6-dinitrotoluene | 1.0           |           | 0.074             | 0.31 |
| 2-Nitrotoluene             | 2.0           |           | 0.082             | 0.31 |
| 4-Nitrotoluene             | 1.9           |           | 0.082             | 0.31 |
| 3-Nitrotoluene             | 0.19          | J         | 0.14              | 0.31 |
| Surrogate                  | %Rec          | Qualifier | Acceptance Limits |      |
| 1,2-Dinitrobenzene         | 109           |           | 70 - 130          |      |

025/30/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW809

Lab Sample ID: 500-45518-5

Date Sampled: 04/16/2012 1327

Client Matrix: Water

Date Received: 04/17/2012 1230

**8330 Nitroaromatics and Nitramines (HPLC)**

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146863 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-147010 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/20/2012 1923 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/19/2012 2030 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 107  |           | 70 - 130          |

025/30/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW806

Lab Sample ID: 500-45518-6

Date Sampled: 04/16/2012 1223

Client Matrix: Water

Date Received: 04/17/2012 1230

**8330 Nitroaromatics and Nitramines (HPLC)**

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146863 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-147010 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/20/2012 2015 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/19/2012 2030 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 108  |           | 70 - 130          |

025/35/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45518-1

Client Sample ID: JP-M13-GWMW807

Lab Sample ID: 500-45518-7

Date Sampled: 04/16/2012 1127

Client Matrix: Water

Date Received: 04/17/2012 1230

**8330 Nitroaromatics and Nitramines (HPLC)**

Analysis Method: 8330

Analysis Batch: 500-146863

Instrument ID: INST39-40

Prep Method: 3535

Prep Batch: 500-147010

Initial Weight/Volume: 770 mL

Dilution: 1.0

Final Weight/Volume: 6.0 mL

Analysis Date: 04/20/2012 2158

Injection Volume: 100 µL

Prep Date: 04/19/2012 2030

Result Type: PRIMARY

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16 JS      |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 108  |           | 70 - 130          |

025/36/12

LDC #: 27649A40

## VALIDATION COMPLETENESS WORKSHEET

SDG #: 500-45518-1

Level III

Laboratory: Test America, Inc.

Date: 5/22/12

Page: 1 of 1

Reviewer: ma2nd Reviewer: Q**METHOD:** HPLC Explosives (EPA SW 846 Method 8330)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                      |     | Comments                  |
|-------|--------------------------------------|-----|---------------------------|
| I.    | Technical holding times              | A   | Sampling dates: 4/16/12   |
| II.   | Initial calibration                  | A   | 1. RSD $\leq$ 20%.        |
| III.  | Calibration verification/ICV         | SWA | 1. D $\leq$ 15% , 1cv/cov |
| IV.   | Blanks                               | A   |                           |
| V.    | Surrogate recovery                   | A   |                           |
| VI.   | Matrix spike/Matrix spike duplicates | A   | ms/D                      |
| VII.  | Laboratory control samples           | ASW | LCS                       |
| VIII. | Target compound identification       | N   |                           |
| IX.   | Compound quantitation/RL/LOQ/LODs    | SWA |                           |
| X.    | System Performance                   | N   |                           |
| XI.   | Overall assessment of data           | A   |                           |
| XII.  | Field duplicates                     | SW  | FD = 3, 4                 |
| XIII. | Field blanks                         | N   |                           |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples: WATER

|    |                    |    |           |    |  |    |  |
|----|--------------------|----|-----------|----|--|----|--|
| 1  | JP-M13-GWMW808     | 11 | 147010 MB | 21 |  | 31 |  |
| 2  | JP-M13-GWMW126R    | 12 |           | 22 |  | 32 |  |
| 3  | JP-M13-GWMW362     | 13 |           | 23 |  | 33 |  |
| 4  | JP-M13-GWMW999     | 14 |           | 24 |  | 34 |  |
| 5  | JP-M13-GWMW809     | 15 |           | 25 |  | 35 |  |
| 6  | JP-M13-GWMW806     | 16 |           | 26 |  | 36 |  |
| 7  | JP-M13-GWMW807     | 17 |           | 27 |  | 37 |  |
| 8  | JP-M13-GWMW126RMS  | 18 |           | 28 |  | 38 |  |
| 9  | JP-M13-GWMW126RMSD | 19 |           | 29 |  | 39 |  |
| 10 |                    | 20 |           | 30 |  | 40 |  |

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

# VALIDATION FINDINGS WORKSHEET

METHOD: GC / HPLC

| 8310                      | 8330                          | 8151                 | 8141                | 8141(Con't)           | 8021B             |
|---------------------------|-------------------------------|----------------------|---------------------|-----------------------|-------------------|
| A. Acenaphthene           | A. HMX                        | A. 2,4-D             | A. Dichlorvos       | V. Fensulfothion      | V. Benzene        |
| B. Acenaphthylene         | B. RDX                        | B. 2,4-DB            | B. Mevinphos        | W. Bolstar            | CC. Toluene       |
| C. Anthracene             | C. 1,3,5-Trinitrobenzene      | C. 2,4,5-T           | C. Demeton-O        | X. EPN                | EE. Ethyl Benzene |
| D. Benzo(a)anthracene     | D. 1,3-Dinitrobenzene         | D. 2,4,5-TP          | D. Demeton-S        | Y. Azinphos-methyl    | SSS. O-Xylene     |
| E. Benzo(a)pyrene         | E. Tetra                      | E. Dinoseb           | E. Ethoprop         | Z. Coumaphos          | RRR. MP-Xylene    |
| F. Benzo(b)fluoranthene   | F. Nitrobenzene               | F. Dichlorprop       | F. Naled            | AA. Parathion         | GG. Total Xylene  |
| G. Benzo(g,h,i)perylene   | G. 2,4,6-Trinitrotoluene      | G. Dicamba           | G. Sulfotep         | BB. Trichloronate     |                   |
| H. Benzo(k)fluoranthene   | H. 4-Amino-2,6-dinitrotoluene | H. Dalapon           | H. Phorate          | CC. Trichlorinate     |                   |
| I. Chrysene               | I. 2-Amino-4,6-dinitrotoluene | I. MCPP              | I. Dimethoate       | DD. Trifluralin       |                   |
| J. Dibenz(a,h)anthracene  | J. 2,4-Dinitrotoluene         | J. MCPA              | J. Diazinon         | EE. Def               |                   |
| K. Fluoranthene           | K. 2,6-Dinitrotoluene         | K. Pentachlorophenol | K. Disulfoton       | FF. Prowl             |                   |
| L. Fluorene               | L. 2-Nitrotoluene             | L. 2,4,5-TP (silvex) | L. Parathion-methyl | GG. Ethion            |                   |
| M. Indeno(1,2,3-cd)pyrene | M. 3-Nitrotoluene             | M. Silvex            | M. Ronnel           | HH. Famphur           |                   |
| N. Naphthalene            | N. 4-Nitrotoluene             |                      | N. Malathion        | II. Phosmet           |                   |
| O. Phenanthrene           | O. Nitroglycerin              |                      | O. Chlorpyrifos     | JJ. Tetrachlorvinphos |                   |
| P. Pyrene                 | P.                            |                      | P. Fenthion         | KK. Demeton (total)   |                   |
| Q.                        | Q                             |                      | Q. Parathion-ethyl  |                       |                   |
| R.                        |                               |                      | R. Trichlorinate    |                       |                   |
| S.                        |                               |                      | S. Merphos          |                       |                   |
|                           |                               |                      | T. Stirofos         |                       |                   |
|                           |                               |                      | U. Tokuthion        |                       |                   |

Notes:

# VALIDATION FINDINGS WORKSHEET

## Continuing Calibration

GC          / HPLC         

indications below for all questions answered "N". Not applicable questions are identified as "N/A".

Continuing calibration calculation was performed?          %D or          %R

Were continuing calibration standards analyzed at the required frequencies?

Did the continuing calibration standards meet the %D / %R validation criteria of          <20.0% / 80-120%?

Were the retention times for all calibrated compounds within their respective acceptance windows?

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
What type of continuing calibration calculation was performed?       %D or       %R

Y N N/A

Did the continuing calibration standards meet the %D / %R validation criteria of <20.0% / 80-120%?

**Level IV-Only**

Were the retention times for all calibrated compounds within their respective acceptance windows?

[illegible]

**Level IV/D Only**

|  | Y | N | N/A |
|--|---|---|-----|
| Did the reported results for detected target compounds agree within 10.0% of the recalculated results? |   |   |     |

If no, please see findings below.

Comments:

LDC#: 27649A40

# VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: 1 of 1  
Reviewer: AA  
2nd Reviewer: AL

METHOD: HPLC Explosives (EPA SW 846 Method 8330)

Y N NA  
Y N NA

Were field duplicate pairs identified in this SDG?

Were target analytes detected in the field duplicate pairs?

| Analyte | Concentration (ug/L) |       | (≤ 25 )<br>RPD | (ug/L)<br>Difference     | Qualifications<br>(Parent Only) |
|---------|----------------------|-------|----------------|--------------------------|---------------------------------|
|         | 3                    | 4     |                |                          |                                 |
| G       | 0.073                | 0.097 |                | (limit ≤ 0.80)<br>0.024  | No Qual.                        |
| J       | 4.9                  | 5.4   | 10             |                          | ↓                               |
| I       | 1.2                  | 1.2   | <del>10</del>  | (≤ 1.55)<br>0            |                                 |
| H       | 1.1                  | 1.0   |                | (≤ 0.80)<br>0.1 (≤ 1.55) |                                 |
| L       | 0.24                 | 2.0   |                | 1.76 (≤ 0.80)            |                                 |
| N       | 0.31U                | 1.9   |                | 1.59 (≤ 0.80)            | J/A dets.<br>X J/U/A            |

| Analyte | Concentration (ug/L) |             | (≤ 25 )<br>RPD | (ug/L)<br>Difference | Qualifications<br>(Parent Only) |
|---------|----------------------|-------------|----------------|----------------------|---------------------------------|
|         | 3                    | 4           |                |                      |                                 |
| M       | 0.31U                | 0.19<br>1.9 |                | 0.12 (≤ 0.80)        | No Qual.                        |
|         |                      |             |                |                      |                                 |
|         |                      |             |                |                      |                                 |
|         |                      |             |                |                      |                                 |
|         |                      |             |                |                      |                                 |
|         |                      |             |                |                      |                                 |

**Laboratory Data Consultants, Inc.**  
**Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 16, 2012  
**LDC Report Date:** May 24, 2012  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-45519-1

**Sample Identification**

JP-M11-GWMW802  
JP-M11-GWMW805  
JP-M11-GWMW335  
JP-M11-GWMW336  
JP-Tripblank-0412

## Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds with the following exceptions:

| Date    | Compound         | %D   | Associated Samples             | Flag                                    | A or P |
|---------|------------------|------|--------------------------------|---|--------|
| 4/20/12 | Isopropylbenzene | 20.4 | All samples in SDG 500-45519-1 | J (all detects)<br>UJ (all non-detects) | A      |

All of the continuing calibration relative response factors (RRF) for were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

Sample JP-Tripblank-0412 was identified as a trip blank. No volatile contaminants were found.

## **VI. Surrogate Spikes**

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## **VII. Matrix Spike/Matrix Spike Duplicates**

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## **VIII. Laboratory Control Samples (LCS)**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## **IX. Regional Quality Assurance and Quality Control**

Not applicable.

## **X. Internal Standards**

All internal standard areas and retention times were within QC limits.

## **XI. Target Compound Identifications**

Raw data were not reviewed for this SDG.

## **XII. Compound Quantitation and RLs**

Raw data were not reviewed for this SDG.

## **XIII. Tentatively Identified Compounds (TICs)**

Raw data were not reviewed for this SDG.

## **XIV. System Performance**

Raw data were not reviewed for this SDG.

## **XV. Overall Assessment of Data**

Data flags are summarized at the end of this report if data has been qualified.

## **XVI. Field Duplicates**

No field duplicates were identified in this SDG.

**JOAAP-GW****Volatiles - Data Qualification Summary - SDG 500-45519-1**

| SDG         | Sample  | Compound         | Flag                                    | A or P | Reason                             |
|-------------|---|------------------|---|--------|------------------------------------|
| 500-45519-1 | JP-M11-GWMW802<br>JP-M11-GWMW805<br>JP-M11-GWMW335<br>JP-M11-GWMW336<br>JP-Tripblank-0412 | Isopropylbenzene | J (all detects)<br>UJ (all non-detects) | A      | Continuing<br>calibration (ICV %D) |

**JOAAP-GW****Volatiles - Laboratory Blank Data Qualification Summary - SDG 500-45519-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Volatiles - Field Blank Data Qualification Summary - SDG 500-45519-1**

No Sample Data Qualified in this SDG

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW802

Lab Sample ID: 500-45519-2

Client Matrix: Water

Date Sampled: 04/16/2012 1140

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45519-02.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0436

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0436

| Analyte                     | Result (ug/L) | Qualifier | MDL  | RL  |
|-----------------------------|---------------|-----------|------|-----|
| Acetone                     | <5.0          |           | 1.9  | 5.0 |
| Benzene                     | <1.0          |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0          |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0          |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0          |           | 0.23 | 1.0 |
| Bromoform                   | <1.0          |           | 0.45 | 1.0 |
| Bromomethane                | <1.4          |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0          |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0          |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0          |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0          |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0          |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0          |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0          |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0          |           | 0.25 | 1.0 |
| Chloroethane                | <1.4          |           | 0.33 | 1.4 |
| Chloroform                  | <1.0          |           | 0.25 | 1.0 |
| Chloromethane               | <1.0          |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0          |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6          |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0          |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0          |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0          |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0          |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0          |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0          |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0          |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0          |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0          |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0          |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0          |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0          |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0          |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0          |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0          |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0          |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0          |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0          |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0          |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0          | 05        | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0          |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0          |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0          |           | 0.79 | 5.0 |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW802

Lab Sample ID: 500-45519-2

Client Matrix: Water

Date Sampled: 04/16/2012 1140

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45519-02.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0436

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0436

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0          |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0          |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 93   |           | 75 - 120          |
| Dibromofluoromethane         | 101  |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 98   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 102  |           | 85 - 120          |

025/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW805

Lab Sample ID: 500-45519-3

Date Sampled: 04/16/2012 1235

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45519-03.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0500

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0500

| Analyte                     | Result (ug/L) | Qualifier | MDL  | RL  |
|-----------------------------|---------------|-----------|------|-----|
| Acetone                     | <5.0          |           | 1.9  | 5.0 |
| Benzene                     | <1.0          |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0          |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0          |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0          |           | 0.23 | 1.0 |
| Bromoform                   | <1.0          |           | 0.45 | 1.0 |
| Bromomethane                | <1.4          |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0          |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0          |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0          |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0          |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0          |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0          |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0          |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0          |           | 0.25 | 1.0 |
| Chloroethane                | <1.4          |           | 0.33 | 1.4 |
| Chloroform                  | <1.0          |           | 0.25 | 1.0 |
| Chloromethane               | <1.0          |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0          |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6          |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0          |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0          |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0          |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0          |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0          |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0          |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0          |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0          |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0          |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0          |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0          |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0          |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0          |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0          |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0          |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0          |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0          |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0          |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0          |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0          | WS        | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0          |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0          |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0          |           | 0.79 | 5.0 |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW805

Lab Sample ID: 500-45519-3

Date Sampled: 04/16/2012 1235

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

|                                |                            |                             |
|--------------------------------|----------------------------|-----------------------------|
| Analysis Method: 8260B         | Analysis Batch: 500-147778 | Instrument ID: CMS19        |
| Prep Method: 5030B             | Prep Batch: N/A            | Lab File ID: 45519-03.D     |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 5 mL |
| Analysis Date: 04/27/2012 0500 |                            | Final Weight/Volume: 5 mL   |
| Prep Date: 04/27/2012 0500     |                            |                             |

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0          |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0          |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 93   |           | 75 - 120          |
| Dibromofluoromethane         | 95   |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 99   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 99   |           | 85 - 120          |

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW335

Lab Sample ID: 500-45519-4

Date Sampled: 04/16/2012 1325

Client Matrix: Water

Date Received: 04/17/2012 1230

**8260B VOC**

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45519-04.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0523

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0523

| Analyte                     | Result (ug/L) | Qualifier | MDL  | RL  |
|-----------------------------|---------------|-----------|------|-----|
| Acetone                     | <5.0          |           | 1.9  | 5.0 |
| Benzene                     | <1.0          |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0          |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0          |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0          |           | 0.23 | 1.0 |
| Bromoform                   | <1.0          |           | 0.45 | 1.0 |
| Bromomethane                | <1.4          |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0          |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0          |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0          |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0          |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0          |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0          |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0          |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0          |           | 0.25 | 1.0 |
| Chloroethane                | <1.4          |           | 0.33 | 1.4 |
| Chloroform                  | <1.0          |           | 0.25 | 1.0 |
| Chloromethane               | <1.0          |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0          |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6          |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0          |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0          |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0          |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0          |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0          |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0          |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0          |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0          |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0          |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0          |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0          |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0          |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0          |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0          |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0          |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0          |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0          |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0          |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0          |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0          | 05        | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0          |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0          |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0          |           | 0.79 | 5.0 |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW335

Lab Sample ID: 500-45519-4

Date Sampled: 04/16/2012 1325

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45519-04.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0523

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0523

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0          |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0          |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 90   |           | 75 - 120          |
| Dibromofluoromethane         | 94   |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 96   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 98   |           | 85 - 120          |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW336

Lab Sample ID: 500-45519-5

Client Matrix: Water

Date Sampled: 04/16/2012 1410

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Prep Method: 5030B

Dilution: 1.0

Analysis Date: 04/27/2012 0546

Prep Date: 04/27/2012 0546

Analysis Batch: 500-147778

Prep Batch: N/A

Instrument ID: CMS19

Lab File ID: 45519-05.D

Initial Weight/Volume: 5 mL

Final Weight/Volume: 5 mL

| Analyte                     | Result (ug/L) | Qualifier | MDL  | RL  |
|-----------------------------|---------------|-----------|------|-----|
| Acetone                     | <5.0          |           | 1.9  | 5.0 |
| Benzene                     | <1.0          |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0          |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0          |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0          |           | 0.23 | 1.0 |
| Bromoform                   | <1.0          |           | 0.45 | 1.0 |
| Bromomethane                | <1.4          |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0          |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0          |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0          |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0          |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0          |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0          |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0          |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0          |           | 0.25 | 1.0 |
| Chloroethane                | <1.4          |           | 0.33 | 1.4 |
| Chloroform                  | <1.0          |           | 0.25 | 1.0 |
| Chloromethane               | <1.0          |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0          |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6          |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0          |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0          |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0          |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0          |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0          |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0          |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0          |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0          |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0          |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0          |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0          |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0          |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0          |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0          |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0          |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0          |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0          |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0          |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0          |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0          | US        | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0          |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0          |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0          |           | 0.79 | 5.0 |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW336

Lab Sample ID: 500-45519-5

Date Sampled: 04/16/2012 1410

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45519-05.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0546

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0546

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0          |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0          |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 90   |           | 75 - 120          |
| Dibromofluoromethane         | 98   |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 95   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 100  |           | 85 - 120          |

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-Tripblank-0412

Lab Sample ID: 500-45519-7TB

Date Sampled: 04/16/2012 1200

Client Matrix: Water

Date Received: 04/17/2012 1230

**8260B VOC**

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45519-07.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0610

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0610

| Analyte                     | Result (ug/L) | Qualifier | MDL  | RL  |
|-----------------------------|---------------|-----------|------|-----|
| Acetone                     | <5.0          |           | 1.9  | 5.0 |
| Benzene                     | <1.0          |           | 0.12 | 1.0 |
| Bromobenzene                | <1.0          |           | 0.31 | 1.0 |
| Bromochloromethane          | <1.0          |           | 0.50 | 1.0 |
| Bromodichloromethane        | <1.0          |           | 0.23 | 1.0 |
| Bromoform                   | <1.0          |           | 0.45 | 1.0 |
| Bromomethane                | <1.4          |           | 0.49 | 1.4 |
| 2-Butanone (MEK)            | <5.0          |           | 1.0  | 5.0 |
| n-Butylbenzene              | <1.0          |           | 0.21 | 1.0 |
| sec-Butylbenzene            | <1.0          |           | 0.19 | 1.0 |
| tert-Butylbenzene           | <1.0          |           | 0.24 | 1.0 |
| Carbon disulfide            | <5.0          |           | 0.44 | 5.0 |
| Carbon tetrachloride        | <1.0          |           | 0.28 | 1.0 |
| Chlorobenzene               | <1.0          |           | 0.24 | 1.0 |
| Dibromochloromethane        | <1.0          |           | 0.25 | 1.0 |
| Chloroethane                | <1.4          |           | 0.33 | 1.4 |
| Chloroform                  | <1.0          |           | 0.25 | 1.0 |
| Chloromethane               | <1.0          |           | 0.24 | 1.0 |
| 2-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| Vinyl acetate               | <2.0          |           | 0.48 | 2.0 |
| 4-Chlorotoluene             | <1.0          |           | 0.21 | 1.0 |
| 1,2-Dibromo-3-Chloropropane | <2.6          |           | 1.2  | 2.6 |
| 1,2-Dibromoethane           | <1.0          |           | 0.45 | 1.0 |
| Dibromomethane              | <1.0          |           | 0.39 | 1.0 |
| 1,2-Dichlorobenzene         | <1.0          |           | 0.21 | 1.0 |
| 1,3-Dichlorobenzene         | <1.0          |           | 0.26 | 1.0 |
| 1,4-Dichlorobenzene         | <1.0          |           | 0.24 | 1.0 |
| Dichlorodifluoromethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1-Dichloroethane          | <1.0          |           | 0.24 | 1.0 |
| 1,2-Dichloroethane          | <1.0          |           | 0.28 | 1.0 |
| 1,1-Dichloroethene          | <1.0          |           | 0.29 | 1.0 |
| cis-1,2-Dichloroethene      | <1.0          |           | 0.22 | 1.0 |
| trans-1,2-Dichloroethene    | <1.0          |           | 0.27 | 1.0 |
| 1,2-Dichloropropane         | <1.0          |           | 0.36 | 1.0 |
| 1,3-Dichloropropane         | <1.0          |           | 0.27 | 1.0 |
| 2,2-Dichloropropane         | <1.0          |           | 0.31 | 1.0 |
| 1,1-Dichloropropene         | <1.0          |           | 0.25 | 1.0 |
| cis-1,3-Dichloropropene     | <1.0          |           | 0.28 | 1.0 |
| trans-1,3-Dichloropropene   | <1.0          |           | 0.35 | 1.0 |
| Ethylbenzene                | <1.0          |           | 0.14 | 1.0 |
| 2-Hexanone                  | <5.0          |           | 0.56 | 5.0 |
| Hexachlorobutadiene         | <1.0          |           | 0.45 | 1.0 |
| Isopropylbenzene            | <1.0          | JS        | 0.21 | 1.0 |
| p-Isopropyltoluene          | <1.0          |           | 0.24 | 1.0 |
| Methylene Chloride          | <3.0          |           | 0.63 | 3.0 |
| 4-Methyl-2-pentanone (MIBK) | <5.0          |           | 0.79 | 5.0 |

025/35/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-Tripblank-0412

Lab Sample ID: 500-45519-7TB

Client Matrix: Water

Date Sampled: 04/16/2012 1200

Date Received: 04/17/2012 1230

## 8260B VOC

Analysis Method: 8260B

Analysis Batch: 500-147778

Instrument ID: CMS19

Prep Method: 5030B

Prep Batch: N/A

Lab File ID: 45519-07.D

Dilution: 1.0

Initial Weight/Volume: 5 mL

Analysis Date: 04/27/2012 0610

Final Weight/Volume: 5 mL

Prep Date: 04/27/2012 0610

| Analyte                   | Result (ug/L) | Qualifier | MDL  | RL  |
|---------------------------|---------------|-----------|------|-----|
| Methyl tert-butyl ether   | <1.0          |           | 0.28 | 1.0 |
| Naphthalene               | <1.0          |           | 0.24 | 1.0 |
| N-Propylbenzene           | <1.0          |           | 0.19 | 1.0 |
| Styrene                   | <1.0          |           | 0.26 | 1.0 |
| 1,1,1,2-Tetrachloroethane | <1.0          |           | 0.31 | 1.0 |
| 1,1,2,2-Tetrachloroethane | <1.0          |           | 0.35 | 1.0 |
| Tetrachloroethene         | <1.0          |           | 0.22 | 1.0 |
| Toluene                   | <1.0          |           | 0.15 | 1.0 |
| 1,2,3-Trichlorobenzene    | <1.0          |           | 0.36 | 1.0 |
| 1,2,4-Trichlorobenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,1,1-Trichloroethane     | <1.0          |           | 0.26 | 1.0 |
| 1,1,2-Trichloroethane     | <1.0          |           | 0.30 | 1.0 |
| Trichloroethene           | <1.0          |           | 0.18 | 1.0 |
| Trichlorofluoromethane    | <1.0          |           | 0.22 | 1.0 |
| 1,2,3-Trichloropropane    | <1.2          |           | 0.60 | 1.2 |
| 1,2,4-Trimethylbenzene    | <1.0          |           | 0.22 | 1.0 |
| 1,3,5-Trimethylbenzene    | <1.0          |           | 0.23 | 1.0 |
| Vinyl chloride            | <1.0          |           | 0.13 | 1.0 |
| o-Xylene                  | <1.0          |           | 0.13 | 1.0 |
| m&p-Xylene                | <2.0          |           | 0.30 | 2.0 |
| Xylenes, Total            | <1.0          |           | 0.30 | 1.0 |

| Surrogate                    | %Rec | Qualifier | Acceptance Limits |
|------------------------------|------|-----------|-------------------|
| 4-Bromofluorobenzene (Surr)  | 92   |           | 75 - 120          |
| Dibromofluoromethane         | 101  |           | 85 - 115          |
| 1,2-Dichloroethane-d4 (Surr) | 99   |           | 70 - 120          |
| Toluene-d8 (Surr)            | 102  |           | 85 - 120          |

025/30/12

LDC #: 27649B1

## VALIDATION COMPLETENESS WORKSHEET

SDG #: 500-45519-1

Level III

Laboratory: Test America, Inc.

Date: 5/24/12

Page: 1 of 1

Reviewer: C

2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                                |    | Comments                |
|-------|--|----|-------------------------|
| I.    | Technical holding times                        | A  | Sampling dates: 4/16/12 |
| II.   | GC/MS Instrument performance check             | A  |                         |
| III.  | Initial calibration                            | A  | %RSD = 30/15            |
| IV.   | Continuing calibration/ICV                     | SW | CCV/10V = 20            |
| V.    | Blanks   | A  |                         |
| VI.   | Surrogate spikes                               | A  |                         |
| VII.  | Matrix spike/Matrix spike duplicates           | N  | check                   |
| VIII. | Laboratory control samples                     | A  | LCS                     |
| IX.   | Regional Quality Assurance and Quality Control | N  |                         |
| X.    | Internal standards                             | A  |                         |
| XI.   | Target compound identification                 | N  |                         |
| XII.  | Compound quantitation/RL/LOQ/LODs              | N  |                         |
| XIII. | Tentatively identified compounds (TICs)        | N  |                         |
| XIV.  | System performance                             | N  |                         |
| XV.   | Overall assessment of data                     | A  |                         |
| XVI.  | Field duplicates                               | N  |                         |
| XVII. | Field blanks                                   | ND | TB = 5                  |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

W

|    |                   |    |               |    |  |    |  |
|----|-------------------|----|---------------|----|--|----|--|
| 1  | JP-M11-GWMW802    | 11 | MB 500-147718 | 21 |  | 31 |  |
| 2  | JP-M11-GWMW805    | 12 |               | 22 |  | 32 |  |
| 3  | JP-M11-GWMW335    | 13 |               | 23 |  | 33 |  |
| 4  | JP-M11-GWMW336    | 14 |               | 24 |  | 34 |  |
| 5  | JP-Tripblank-0412 | 15 |               | 25 |  | 35 |  |
| 6  |                   | 16 |               | 26 |  | 36 |  |
| 7  |                   | 17 |               | 27 |  | 37 |  |
| 8  |                   | 18 |               | 28 |  | 38 |  |
| 9  |                   | 19 |               | 29 |  | 39 |  |
| 10 |                   | 20 |               | 30 |  | 40 |  |

# TARGET COMPOUND WORKSHEET

METHOD: VOA

|                              |                                 |                               |  |                          |
|------------------------------|---------------------------------|-------------------------------|--|--------------------------|
| A. Chloromethane             | U. 1,1,2-Trichloroethane        | OO. 2,2-Dichloropropane       | III. n-Butylbenzene                        | CCCC. 1-Chlorohexane     |
| B. Bromomethane              | V. Benzene                      | PP. Bromochloromethane        | JJJ. 1,2-Dichlorobenzene                   | DDDD. Isopropyl alcohol  |
| C. Vinyl chloride            | W. trans-1,3-Dichloropropene    | QQ. 1,1-Dichloropropene       | KKK. 1,2,4-Trichlorobenzene                | EEEE. Acetonitrile       |
| D. Chloroethane              | X. Bromoform                    | RR. Dibromomethane            | LLL. Hexachlorobutadiene                   | FFFF. Acrolein           |
| E. Methylene chloride        | Y. 4-Methyl-2-pentanone         | SS. 1,3-Dichloropropane       | MMM. Naphthalene                           | GGGG. Acrylonitrile      |
| F. Acetone                   | Z. 2-Hexanone                   | TT. 1,2-Dibromoethane         | NNN. 1,2,3-Trichlorobenzene                | HHHH. 1,4-Dioxane        |
| G. Carbon disulfide          | AA. Tetrachloroethene           | UU. 1,1,1,2-Tetrachloroethane | OOO. 1,3,5-Trichlorobenzene                | IIII. Isobutyl alcohol   |
| H. 1,1-Dichloroethene        | BB. 1,1,2,2-Tetrachloroethane   | VV. Isopropylbenzene          | PPP. trans-1,2-Dichloroethene              | JJJJ. Methacrylonitrile  |
| I. 1,1-Dichloroethane        | CC. Toluene                     | WW. Bromobenzene              | QQQ. cis-1,2-Dichloroethene                | KKKK. Propionitrile      |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene               | XX. 1,2,3-Trichloropropane    | RRR. m,p-Xylenes                           | LLLL. Ethyl ether        |
| K. Chloroform                | EE. Ethylbenzene                | YY. n-Propylbenzene           | SSS. o-Xylene                              | MMMM. Benzyl chloride    |
| L. 1,2-Dichloroethane        | FF. Styrene                     | ZZ. 2-Chlorotoluene           | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. Iodomethane        |
| M. 2-Butanone                | GG. Xylenes, total              | AAA. 1,3,5-Trimethylbenzene   | UUU. 1,2-Dichlorotetrafluoroethane         | OOOO. 1,1-Difluoroethane |
| N. 1,1,1-Trichloroethane     | HH. Vinyl acetate               | BBB. 4-Chlorotoluene          | VVV. 4-Ethyltoluene                        | PPPP.                    |
| O. Carbon tetrachloride      | II. 2-Chloroethylvinyl ether    | CCC. tert-Butylbenzene        | WWW. Ethanol                               | QQQQ.                    |
| P. Bromodichloromethane      | JJ. Dichlorodifluoromethane     | DDD. 1,2,4-Trimethylbenzene   | XXX. Di-isopropyl ether                    | RRRR.                    |
| Q. 1,2-Dichloropropane       | KK. Trichlorofluoromethane      | EEE. sec-Butylbenzene         | YYY. tert-Butanol                          | SSSS.                    |
| R. cis-1,3-Dichloropropene   | LL. Methyl-tert-butyl ether     | FFF. 1,3-Dichlorobenzene      | ZZZ. tert-Butyl alcohol                    | TTTT.                    |
| S. Trichloroethene           | MM. 1,2-Dibromo-3-chloropropane | GGG. p-Isopropyltoluene       | AAAA. Ethyl tert-butyl ether               | UUUU.                    |
| T. Dibromochloromethane      | NN. Methyl ethyl ketone         | HHH. 1,4-Dichlorobenzene      | BBBB. tert-Amyl methyl ether               | VVVV.                    |

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

|  |   |   |     |
|--|---|---|-----|
| Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?                   | Y | N | N/A |
| Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? | Y | N | N/A |
| Were all %D and RRFs within the validation criteria of $\leq 20$ %D and $\geq 0.05$ RRF?                           | Y | N | N/A |

CONCAL.1SB

**Laboratory Data Consultants, Inc.  
Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 16, 2012  
**LDC Report Date:** May 24, 2012  
**Matrix:** Water  
**Parameters:** Semivolatiles  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 500-45519-1

**Sample Identification**

JP-M11-GWMW802  
JP-M11-GWMW805  
JP-M11-GWMW335  
JP-M11-GWMW336

## Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs) with the following exceptions:

| Date    | Compound               | %RSD | Associated Samples | Flag            | A or P |
|---------|------------------------|------|--------------------|-----------------|--------|
| 5/1/12  | N-Nitrosodimethylamine | 33.0 | JP-M11-GWMW802     | J (all detects) | A      |
|         | 3&4-Methylphenol       | 19.0 | JP-M11-GWMW805     | J (all detects) |        |
|         | Dibenzofuran           | 17.0 | JP-M11-GWMW335     | J (all detects) |        |
|         | Di-n-butylphthalate    | 17.0 | MB 500-146890      | J (all detects) |        |
|         | Benzo(k)fluoranthene   | 22.0 |                    | J (all detects) |        |
| 4/25/12 | Benzoic acid           | 55.0 | JP-M11-GWMW336     | J (all detects) | A      |
|         | 2,4-Dinitrophenol      | 19.0 |                    | J (all detects) |        |

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination ( $r^2$ ) were greater than or equal to 0.990 .

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds with the following exceptions:

| Date   | Compound   | %D                           | Associated Samples | Flag                                    | A or P |
|--------|--|------------------------------|--------------------|---|--------|
| 5/4/12 | N-Nitrosodimethylamine<br>Benzoic acid<br>2,4-Dinitrophenol<br>4-Nitrophenol | 41.8<br>44.4<br>32.5<br>25.6 | JP-M11-GWMW336     | J (all detects)<br>UJ (all non-detects) | A      |

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds with the following exceptions:

| Date    | Compound   | %D                   | Associated Samples  | Flag                                    | A or P |
|---------|--|----------------------|---|---|--------|
| 5/1/12  | 2-Methylnaphthalene<br>Dibenzofuran<br>Di-n-butylphthalate | 20.3<br>21.3<br>20.5 | JP-M11-GWMW802<br>JP-M11-GWMW805<br>JP-M11-GWMW335<br>MB 500-146890 | J (all detects)<br>UJ (all non-detects) | A      |
| 4/25/12 | Benzoic acid   | 125.4                | JP-M11-GWMW336  | J (all detects)<br>UJ (all non-detects) | A      |

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No semivolatile contaminants were found in the method blanks.

No field blanks were identified in this SDG.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were not within QC limits. Since there were no associated samples, no data were qualified.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## **IX. Regional Quality Assurance and Quality Control**

Not applicable.

## **X. Internal Standards**

All internal standard areas and retention times were within QC limits.

## **XI. Target Compound Identifications**

Raw data were not reviewed for this SDG.

## **XII. Compound Quantitation and RLs**

Raw data were not reviewed for this SDG.

## **XIII. Tentatively Identified Compounds (TICs)**

Raw data were not reviewed for this SDG.

## **XIV. System Performance**

Raw data were not reviewed for this SDG.

## **XV. Overall Assessment**

Data flags are summarized at the end of this report if data has been qualified.

## **XVI. Field Duplicates**

No field duplicates were identified in this SDG.

**JOAAP-GW****Semivolatiles - Data Qualification Summary - SDG 500-45519-1**

| SDG         | Sample   | Compound  | Flag  | A or P | Reason                          |
|-------------|--|---|---|--------|---------------------------------|
| 500-45519-1 | JP-M11-GWMW802<br>JP-M11-GWMW805<br>JP-M11-GWMW335 | N-Nitrosodimethylamine<br>3&4-Methylphenol<br>Dibenzofuran<br>Di-n-butylphthalate<br>Benzo(k)fluoranthene | J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects) | A      | Initial calibration (%RSD)      |
| 500-45519-1 | JP-M11-GWMW336                                     | Benzoic acid<br>2,4-Dinitrophenol   | J (all detects)   | A      | Initial calibration (%RSD)      |
| 500-45519-1 | JP-M11-GWMW336                                     | N-Nitrosodimethylamine<br>Benzoic acid<br>2,4-Dinitrophenol<br>4-Nitrophenol                              | J (all detects)<br>UJ (all non-detects)   | A      | Continuing calibration (%D)     |
| 500-45519-1 | JP-M11-GWMW802<br>JP-M11-GWMW805<br>JP-M11-GWMW335 | 2-Methylnaphthalene<br>Dibenzofuran<br>Di-n-butylphthalate  | J (all detects)<br>UJ (all non-detects)   | A      | Continuing calibration (ICV %D) |
| 500-45519-1 | JP-M11-GWMW336                                     | Benzoic acid  | J (all detects)<br>UJ (all non-detects)   | A      | Continuing calibration (ICV %D) |

**JOAAP-GW****Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 500-45519-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Semivolatiles - Field Blank Data Qualification Summary - SDG 500-45519-1**

No Sample Data Qualified in this SDG

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW802

Lab Sample ID: 500-45519-2

Date Sampled: 04/16/2012 1140

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

Analysis Method: 8270C

Analysis Batch: 500-148426

Instrument ID: CMS12

Prep Method: 3510C

Prep Batch: 500-146890

Lab File ID: 45519-2.D

Dilution: 1.0

Initial Weight/Volume: 1070 mL

Analysis Date: 05/02/2012 2342

Final Weight/Volume: 1.0 mL

Prep Date: 04/19/2012 0759

Injection Volume: 1 uL

| Analyte                      | Result (ug/L) | Qualifier | MDL   | RL   |
|------------------------------|---------------|-----------|-------|------|
| Acenaphthene                 | <0.93         |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3          |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93         |           | 0.30  | 0.93 |
| Anthracene                   | <0.93         |           | 0.30  | 0.93 |
| Benidine                     | <37           |           | 19    | 37   |
| Benzoic acid                 | <19           |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19         |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19         |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23         |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93         |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19         |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19           |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9          |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9          |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9          |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3          |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7          |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9          |           | 0.25  | 1.9  |
| Carbazole                    | <4.7          |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3          |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3          |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9          |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7          |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7          |           | 0.76  | 4.7  |
| Chrysene                     | <0.47         |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28         |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9          | SS        | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7          | SS        | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9          |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9          |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9          |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7          |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3          |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9          |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3          |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9          |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19           |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19           |           | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3          |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47         |           | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3          |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93         |           | 0.30  | 0.93 |
| Fluorene                     | <0.93         |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7          |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47         |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7          |           | 1.0   | 4.7  |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW802

Lab Sample ID: 500-45519-2

Date Sampled: 04/16/2012 1140

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

Analysis Method: 8270C

Analysis Batch: 500-148426

Instrument ID: CMS12

Prep Method: 3510C

Prep Batch: 500-146890

Lab File ID: 45519-2.D

Dilution: 1.0

Initial Weight/Volume: 1070 mL

Analysis Date: 05/02/2012 2342

Final Weight/Volume: 1.0 mL

Prep Date: 04/19/2012 0759

Injection Volume: 1 uL

| Analyte                   | Result (ug/L)       | Qualifier | MDL   | RL   |
|---------------------------|---------------------|-----------|-------|------|
| Hexachloroethane          | <4.7                |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23               |           | 0.079 | 0.23 |
| Isophorone                | <1.9                |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47 <sup>US</sup> |           | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9                |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9                |           | 0.41  | 1.9  |
| Naphthalene               | <0.93               |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7                |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3                |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3                |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93               |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3                |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19                 |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93               |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47               |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3                |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93               |           | 0.33  | 0.93 |
| Phenol                    | <4.7                |           | 0.34  | 4.7  |
| Pyrene                    | <0.93               |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9                |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3                |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7                |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 25   |           | 20 - 110          |
| Phenol-d5            | 17   |           | 10 - 115          |
| Nitrobenzene-d5      | 46   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 49   | X         | 50 - 110          |
| 2,4,6-Tribromophenol | 56   |           | 40 - 125          |
| Terphenyl-d14        | 72   |           | 50 - 135          |

*05/22/12*

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW805

Lab Sample ID: 500-45519-3

Date Sampled: 04/16/2012 1235

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

Analysis Method: 8270C

Analysis Batch: 500-148426

Instrument ID: CMS12

Prep Method: 3510C

Prep Batch: 500-146890

Lab File ID: 45519-3.D

Dilution: 1.0

Initial Weight/Volume: 1070 mL

Analysis Date: 05/03/2012 0004

Final Weight/Volume: 1.0 mL

Prep Date: 04/19/2012 0759

Injection Volume: 1 uL

| Analyte                      | Result (ug/L) | Qualifier | MDL   | RL   |
|------------------------------|---------------|-----------|-------|------|
| Acenaphthene                 | <0.93         |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3          |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93         |           | 0.30  | 0.93 |
| Anthracene                   | <0.93         |           | 0.30  | 0.93 |
| Benidine                     | <37           |           | 19    | 37   |
| Benzoic acid                 | <19           |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19         |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19         |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23         |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93         |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19         |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19           |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9          |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9          |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9          |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3          |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7          |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9          |           | 0.25  | 1.9  |
| Carbazole                    | <4.7          |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3          |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3          |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9          |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7          |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7          |           | 0.76  | 4.7  |
| Chrysene                     | <0.47         |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28         |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9          | YS        | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7          | YS        | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9          |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9          |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9          |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7          |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3          |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9          |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3          |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9          |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19           |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19           |           | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3          |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47         |           | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3          |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93         |           | 0.30  | 0.93 |
| Fluorene                     | <0.93         |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7          |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47         |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7          |           | 1.0   | 4.7  |

05/29/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW805

Lab Sample ID: 500-45519-3

Date Sampled: 04/16/2012 1235

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

Analysis Method: 8270C

Analysis Batch: 500-148426

Instrument ID: CMS12

Prep Method: 3510C

Prep Batch: 500-146890

Lab File ID: 45519-3.D

Dilution: 1.0

Initial Weight/Volume: 1070 mL

Analysis Date: 05/03/2012 0004

Final Weight/Volume: 1.0 mL

Prep Date: 04/19/2012 0759

Injection Volume: 1 uL

| Analyte                   | Result (ug/L)   | Qualifier | MDL   | RL   |
|---------------------------|-----------------|-----------|-------|------|
| Hexachloroethane          | <4.7            |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23           |           | 0.079 | 0.23 |
| Isophorone                | <1.9            |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47 <i>us</i> |           | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9            |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9            |           | 0.41  | 1.9  |
| Naphthalene               | <0.93           |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7            |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3            |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3            |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93           |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3            |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19             |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93           |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47           |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3            |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93           |           | 0.33  | 0.93 |
| Phenol                    | <4.7            |           | 0.34  | 4.7  |
| Pyrene                    | <0.93           |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9            |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3            |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7            |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 25   |           | 20 - 110          |
| Phenol-d5            | 17   |           | 10 - 115          |
| Nitrobenzene-d5      | 48   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 52   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 58   |           | 40 - 125          |
| Terphenyl-d14        | 75   |           | 50 - 135          |

*ces/ra/12*

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW335

Lab Sample ID: 500-45519-4

Date Sampled: 04/16/2012 1325

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

Analysis Method: 8270C

Analysis Batch: 500-148426

Instrument ID: CMS12

Prep Method: 3510C

Prep Batch: 500-146890

Lab File ID: 45519-4.D

Dilution: 1.0

Initial Weight/Volume: 1070 mL

Analysis Date: 05/03/2012 0027

Final Weight/Volume: 1.0 mL

Prep Date: 04/19/2012 0759

Injection Volume: 1 uL

| Analyte                      | Result (ug/L) | Qualifier | MDL   | RL   |
|------------------------------|---------------|-----------|-------|------|
| Acenaphthene                 | <0.93         |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3          |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93         |           | 0.30  | 0.93 |
| Anthracene                   | <0.93         |           | 0.30  | 0.93 |
| Benidine                     | <37           |           | 19    | 37   |
| Benzoic acid                 | <19           |           | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19         |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19         |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23         |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93         |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19         |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19           |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9          |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9          |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9          |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3          |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7          |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9          |           | 0.25  | 1.9  |
| Carbazole                    | <4.7          |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3          |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3          |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9          |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7          |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7          |           | 0.76  | 4.7  |
| Chrysene                     | <0.47         |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28         |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9          |           | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7          |           | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9          |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9          |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9          |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7          |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3          |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9          |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3          |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9          |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19           |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19           |           | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3          |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47         |           | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3          |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93         |           | 0.30  | 0.93 |
| Fluorene                     | <0.93         |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7          |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47         |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7          |           | 1.0   | 4.7  |

025129/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW335

Lab Sample ID: 500-45519-4

Client Matrix: Water

Date Sampled: 04/16/2012 1325

Date Received: 04/17/2012 1230

## 8270C SVOC

|                                |                            |                                |
|--------------------------------|----------------------------|--------------------------------|
| Analysis Method: 8270C         | Analysis Batch: 500-148426 | Instrument ID: CMS12           |
| Prep Method: 3510C             | Prep Batch: 500-146890     | Lab File ID: 45519-4.D         |
| Dilution: 1.0                  |                            | Initial Weight/Volume: 1070 mL |
| Analysis Date: 05/03/2012 0027 |                            | Final Weight/Volume: 1.0 mL    |
| Prep Date: 04/19/2012 0759     |                            | Injection Volume: 1 uL         |

| Analyte                   | Result (ug/L) | Qualifier | MDL   | RL   |
|---------------------------|---------------|-----------|-------|------|
| Hexachloroethane          | <4.7          |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23         |           | 0.079 | 0.23 |
| Isophorone                | <1.9          |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47 JS      |           | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9          |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9          |           | 0.41  | 1.9  |
| Naphthalene               | <0.93         |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7          |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3          |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3          |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93         |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3          |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19           |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93         |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47         |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3          |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93         |           | 0.33  | 0.93 |
| Phenol                    | <4.7          |           | 0.34  | 4.7  |
| Pyrene                    | <0.93         |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9          |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3          |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7          |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 26   |           | 20 - 110          |
| Phenol-d5            | 19   |           | 10 - 115          |
| Nitrobenzene-d5      | 53   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 54   |           | 50 - 110          |
| 2,4,6-Tribromophenol | 70   |           | 40 - 125          |
| Terphenyl-d14        | 73   |           | 50 - 135          |

*CES/29/12*

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW336

Lab Sample ID: 500-45519-5

Date Sampled: 04/16/2012 1410

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

Analysis Method: 8270C

Analysis Batch: 500-148703

Instrument ID: CMS21

Prep Method: 3510C

Prep Batch: 500-146890

Lab File ID: 45519-5.D

Dilution: 1.0

Initial Weight/Volume: 1070 mL

Analysis Date: 05/04/2012 1812

Final Weight/Volume: 1.0 mL

Prep Date: 04/19/2012 0759

Injection Volume: 1 uL

| Analyte                      | Result (ug/L)  | Qualifier | MDL   | RL   |
|------------------------------|----------------|-----------|-------|------|
| Acenaphthene                 | <0.93          |           | 0.34  | 0.93 |
| N-Nitrosodimethylamine       | <9.3 <i>JS</i> |           | 1.3   | 9.3  |
| Acenaphthylene               | <0.93          |           | 0.30  | 0.93 |
| Anthracene                   | <0.93          |           | 0.30  | 0.93 |
| Benzidine                    | <37            |           | 19    | 37   |
| Benzoic acid                 | <19 <i>JS</i>  | <i>A</i>  | 4.3   | 19   |
| Benzo[a]anthracene           | <0.19          |           | 0.041 | 0.19 |
| Benzo[b]fluoranthene         | <0.19          |           | 0.054 | 0.19 |
| Benzo[k]fluoranthene         | <0.23          |           | 0.069 | 0.23 |
| Benzo[g,h,i]perylene         | <0.93          |           | 0.39  | 0.93 |
| Benzo[a]pyrene               | <0.19          |           | 0.052 | 0.19 |
| Benzyl alcohol               | <19            |           | 2.9   | 19   |
| Bis(2-chloroethoxy)methane   | <1.9           |           | 0.28  | 1.9  |
| Bis(2-chloroethyl)ether      | <1.9           |           | 0.33  | 1.9  |
| 2,2'-oxybis[1-chloropropane] | <1.9           |           | 0.28  | 1.9  |
| Bis(2-ethylhexyl) phthalate  | <9.3           |           | 2.3   | 9.3  |
| 4-Bromophenyl phenyl ether   | <4.7           |           | 0.85  | 4.7  |
| Butyl benzyl phthalate       | <1.9           |           | 0.25  | 1.9  |
| Carbazole                    | <4.7           |           | 0.93  | 4.7  |
| 4-Chloroaniline              | <9.3           |           | 2.0   | 9.3  |
| 4-Chloro-3-methylphenol      | <9.3           |           | 2.1   | 9.3  |
| 2-Chloronaphthalene          | <1.9           |           | 0.32  | 1.9  |
| 2-Chlorophenol               | <4.7           |           | 0.75  | 4.7  |
| 4-Chlorophenyl phenyl ether  | <4.7           |           | 0.76  | 4.7  |
| Chrysene                     | <0.47          |           | 0.13  | 0.47 |
| Dibenz(a,h)anthracene        | <0.28          |           | 0.060 | 0.28 |
| Dibenzofuran                 | <1.9           |           | 0.33  | 1.9  |
| Di-n-butyl phthalate         | <4.7           |           | 0.75  | 4.7  |
| 1,2-Dichlorobenzene          | <1.9           |           | 0.27  | 1.9  |
| 1,3-Dichlorobenzene          | <1.9           |           | 0.23  | 1.9  |
| 1,4-Dichlorobenzene          | <1.9           |           | 0.25  | 1.9  |
| 3,3'-Dichlorobenzidine       | <4.7           |           | 0.88  | 4.7  |
| 2,4-Dichlorophenol           | <9.3           |           | 2.1   | 9.3  |
| Diethyl phthalate            | <1.9           |           | 0.41  | 1.9  |
| 2,4-Dimethylphenol           | <9.3           |           | 3.1   | 9.3  |
| Dimethyl phthalate           | <1.9           |           | 0.36  | 1.9  |
| 4,6-Dinitro-2-methylphenol   | <19            |           | 4.6   | 19   |
| 2,4-Dinitrophenol            | <19 <i>JS</i>  |           | 6.9   | 19   |
| 2,4-Dinitrotoluene           | <1.3           |           | 0.28  | 1.3  |
| 2,6-Dinitrotoluene           | <0.47          |           | 0.11  | 0.47 |
| Di-n-octyl phthalate         | <9.3           |           | 2.3   | 9.3  |
| Fluoranthene                 | <0.93          |           | 0.30  | 0.93 |
| Fluorene                     | <0.93          |           | 0.36  | 0.93 |
| 1,2-Diphenylhydrazine        | <4.7           |           | 0.65  | 4.7  |
| Hexachlorobenzene            | <0.47          |           | 0.13  | 0.47 |
| Hexachlorobutadiene          | <4.7           |           | 1.0   | 4.7  |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GMMW336

Lab Sample ID: 500-45519-5

Date Sampled: 04/16/2012 1410

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8270C SVOC

Analysis Method: 8270C

Analysis Batch: 500-148703

Instrument ID: CMS21

Prep Method: 3510C

Prep Batch: 500-146890

Lab File ID: 45519-5.D

Dilution: 1.0

Initial Weight/Volume: 1070 mL

Analysis Date: 05/04/2012 1812

Final Weight/Volume: 1.0 mL

Prep Date: 04/19/2012 0759

Injection Volume: 1 uL

| Analyte                   | Result (ug/L) | Qualifier | MDL   | RL   |
|---------------------------|---------------|-----------|-------|------|
| Hexachloroethane          | <4.7          |           | 0.91  | 4.7  |
| Indeno[1,2,3-cd]pyrene    | <0.23         |           | 0.079 | 0.23 |
| Isophorone                | <1.9          |           | 0.27  | 1.9  |
| 2-Methylnaphthalene       | <0.47         |           | 0.12  | 0.47 |
| 2-Methylphenol            | <1.9          |           | 0.29  | 1.9  |
| 3 & 4 Methylphenol        | <1.9          |           | 0.41  | 1.9  |
| Naphthalene               | <0.93         |           | 0.28  | 0.93 |
| 2-Nitroaniline            | <4.7          |           | 1.0   | 4.7  |
| 3-Nitroaniline            | <9.3          |           | 2.1   | 9.3  |
| 4-Nitroaniline            | <9.3          |           | 3.7   | 9.3  |
| Nitrobenzene              | <0.93         |           | 0.42  | 0.93 |
| 2-Nitrophenol             | <9.3          |           | 2.0   | 9.3  |
| 4-Nitrophenol             | <19 <i>05</i> |           | 2.2   | 19   |
| N-Nitrosodiphenylamine    | <0.93         |           | 0.32  | 0.93 |
| N-Nitrosodi-n-propylamine | <0.47         |           | 0.13  | 0.47 |
| Pentachlorophenol         | <9.3          |           | 5.2   | 9.3  |
| Phenanthrene              | <0.93         |           | 0.33  | 0.93 |
| Phenol                    | <4.7          |           | 0.34  | 4.7  |
| Pyrene                    | <0.93         |           | 0.45  | 0.93 |
| 1,2,4-Trichlorobenzene    | <1.9          |           | 0.28  | 1.9  |
| 2,4,5-Trichlorophenol     | <9.3          |           | 2.1   | 9.3  |
| 2,4,6-Trichlorophenol     | <4.7          |           | 1.0   | 4.7  |

| Surrogate            | %Rec | Qualifier | Acceptance Limits |
|----------------------|------|-----------|-------------------|
| 2-Fluorophenol       | 27   |           | 20 - 110          |
| Phenol-d5            | 17   |           | 10 - 115          |
| Nitrobenzene-d5      | 52   |           | 40 - 110          |
| 2-Fluorobiphenyl     | 47   | X         | 50 - 110          |
| 2,4,6-Tribromophenol | 58   |           | 40 - 125          |
| Terphenyl-d14        | 71   |           | 50 - 135          |

*05/29/12*

LDC #: 27649B2

## VALIDATION COMPLETENESS WORKSHEET

SDG #: 500-45519-1

Level III

Laboratory: Test America, Inc.

Date: 5/24/12

Page: 1 of 1

Reviewer: [Signature]

2nd Reviewer: [Signature]

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                                |    | Comments                            |
|-------|--|----|-------------------------------------|
| I.    | Technical holding times                        | A  | Sampling dates: 4/16/12             |
| II.   | GC/MS Instrument performance check             | A  |                                     |
| III.  | Initial calibration                            | SW | %RSD ≤ 30/15, 12                    |
| IV.   | Continuing calibration/ICV                     | SW | COV/ICV ≤ 20                        |
| V.    | Blanks   | A  |                                     |
| VI.   | Surrogate spikes                               | SW |                                     |
| VII.  | Matrix spike/Matrix spike duplicates           | SW | JP-M13-GWMW/26R - no used / no qual |
| VIII. | Laboratory control samples                     | A  | LCS                                 |
| IX.   | Regional Quality Assurance and Quality Control | N  |                                     |
| X.    | Internal standards                             | A  |                                     |
| XI.   | Target compound identification                 | N  |                                     |
| XII.  | Compound quantitation/RL/LOQ/LODs              | N  |                                     |
| XIII. | Tentatively identified compounds (TICs)        | N  |                                     |
| XIV.  | System performance                             | N  |                                     |
| XV.   | Overall assessment of data                     | A  |                                     |
| XVI.  | Field duplicates                               | N  |                                     |
| XVII. | Field blanks                                   | N  |                                     |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

W

|    |                |    |               |    |  |    |  |
|----|----------------|----|---------------|----|--|----|--|
| 1  | JP-M11-GWMW802 | 11 | MB 500-146890 | 21 |  | 31 |  |
| 2  | JP-M11-GWMW805 | 12 |               | 22 |  | 32 |  |
| 3  | JP-M11-GWMW335 | 13 |               | 23 |  | 33 |  |
| 4  | JP-M11-GWMW336 | 14 |               | 24 |  | 34 |  |
| 5  |                | 15 |               | 25 |  | 35 |  |
| 6  |                | 16 |               | 26 |  | 36 |  |
| 7  |                | 17 |               | 27 |  | 37 |  |
| 8  |                | 18 |               | 28 |  | 38 |  |
| 9  |                | 19 |               | 29 |  | 39 |  |
| 10 |                | 20 |               | 30 |  | 40 |  |

# VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS BNA

|                                 |                              |                                 |                                  |                                 |
|---------------------------------|------------------------------|---------------------------------|----------------------------------|---------------------------------|
| A. Phenol                       | S. Naphthalene               | KK. 2,4-Dinitrotoluene          | CCC. Benzo(a)anthracene          | UUU. Benzo(b)thiophene          |
| B. Bis (2-chloroethyl) ether    | T. 4-Chloroaniline           | LL. Diethylphthalate            | DDD. Chrysene                    | VVV. Naphthobenzothiophene      |
| C. 2-Chlorophenol               | U. Hexachlorobutadiene       | MM. 4-Chlorophenyl-phenyl ether | EEE. Bis(2-ethylhexyl)phthalate  | WWW. Benzo(e)pyrene             |
| D. 1,3-Dichlorobenzene          | V. 4-Chloro-3-methylphenol   | NN. Fluorene                    | FFF. Di-n-octylphthalate         | XXX. 2,6-Dimethylnaphthalene    |
| E. 1,4-Dichlorobenzene          | W. 2-Methylnaphthalene       | OO. 4-Nitroaniline              | GGG. Benzo(b)fluoranthene        | YYY. 2,3,5-Trimethylnaphthalene |
| F. 1,2-Dichlorobenzene          | X. Hexachlorocyclopentadiene | PP. 4,6-Dinitro-2-methylphenol  | HHH. Benzo(k)fluoranthene        | ZZZ. Perylene                   |
| G. 2-Methylphenol               | Y. 2,4,6-Trichlorophenol     | QQ. N-Nitrosodiphenylamine (1)  | III. Benzo(a)pyrene              | AAAA. Dibenzothiophene          |
| H. 2,2'-Oxybis(1-chloropropane) | Z. 2,4,5-Trichlorophenol     | RR. 4-Bromophenyl-phenylether   | JJJ. Indeno(1,2,3-cd)pyrene      | BBBB. Benzo(a)fluoranthene      |
| I. 4-Methylphenol               | AA. 2-Chloronaphthalene      | SS. Hexachlorobenzene           | KKK. Dibenz(a,h)anthracene       | CCCC. Benzo(b)fluorene          |
| J. N-Nitroso-di-n-propylamine   | BB. 2-Nitroaniline           | TT. Pentachlorophenol           | LLL. Benzo(g,h,i)perylene        | DDDD. cis/trans-Decalin         |
| K. Hexachloroethane             | CC. Dimethylphthalate        | UU. Phenanthrene                | MMM. Bis(2-Chloroisopropyl)ether | EEEE. Biphenyl                  |
| L. Nitrobenzene                 | DD. Acenaphthylene           | VV. Anthracene                  | NNN. Aniline                     | FFFF. Retene                    |
| M. Isophorone                   | EE. 2,6-Dinitrotoluene       | WW. Carbazole                   | OOO. N-Nitrosodimethylamine      | GGGG. C30-Hopane                |
| N. 2-Nitrophenol                | FF. 3-Nitroaniline           | XX. Di-n-butylphthalate         | PPP. Benzoic Acid                | HHHH. 1-Methylphenanthrene      |
| O. 2,4-Dimethylphenol           | GG. Acenaphthene             | YY. Fluoranthene                | QQQ. Benzyl alcohol              | IIII. 2-Naphthylamine           |
| P. Bis(2-chloroethoxy)methane   | HH. 2,4-Dinitrophenol        | ZZ. Pyrene                      | RRR. Pyridine                    | JJJJ. 1,4-Dioxane               |
| Q. 2,4-Dichlorophenol           | II. 4-Nitrophenol            | AAA. Butylbenzylphthalate       | SSS. Benzidine                   | KKKK.                           |
| R. 1,2,4-Trichlorobenzene       | JJ. Dibenzofuran             | BBB. 3,3'-Dichlorobenzidine     | TTT. 1-Methylnaphthalene         | LLLL.                           |

| Question   | Yes | No | N/A |
|--|-----|----|-----|
| Were all %RSDs and RRFs within the validation criteria of $\leq 30\%$ RSD and $\geq 0.05$ RRF? |     |    | N/A |

INICAL.2S

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?

|     |     |
|-----|-----|
| Y/N | N/A |
|-----|-----|

Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?

$$\frac{Y(N)}{Y(N)N/A}$$

Were all %D and RRFs within the validation criteria of  $\leq 20\%$  D and  $\geq 0.05$  RRF?

[illegible]

## Surrogate Recovery

PLEASE SEE QUALIFICATION BELOW FOR ALL QUESTIONS ANSWERED "N". NOT APPLICABLE QUESTIONS ARE IDENTIFIED AS "N/A".

YN WA

|   | Y | N | N/A |
|---|---|---|-----|
| If any %R was less than 10 percent, was a reanalysis performed to confirm %R? |   |   |     |

[illegible]

|                          | QC Limits (Soil) | QC Limits (Water) |
|--------------------------|------------------|-------------------|
| * QC limits are advisory |                  |                   |

| Sample | Compound               | Retention Time (min) |
|--------|------------------------|----------------------|
| S1     | Nitrobenzene-d5        | 23-20                |
| S2     | 2-Fluorobiphenyl       | 30-115               |
| S3     | Terphenyl-d14          | 18-137               |
| S4     | Phenol-d5              | 24-113               |
| S5     | 2-Fluorophenol         | 25-121               |
| S6     | 2,4,6-Tribromophenol   | 19-122               |
| S7     | 2-Chlorophenol-d4      | 20-130*              |
| S8     | 1,2-Dichlorobenzene-d4 | 20-130*              |

**Laboratory Data Consultants, Inc.**  
**Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 16, 2012  
**LDC Report Date:** May 18, 2012  
**Matrix:** Water  
**Parameters:** Dissolved Metals  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-45519-1

**Sample Identification**

JP-M11-GWMW802  
JP-M11-GWMW805  
JP-M11-GWMW335  
JP-M11-GWMW336

## Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B and 7470A for Dissolved Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## **I. Technical Holding Times**

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## **II. ICPMS Tune**

ICP-MS was not utilized in this SDG.

## **III. Calibration**

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No dissolved metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

## **V. ICP Interference Check Sample (ICS) Analysis**

The frequency of analysis was met.

The criteria for analysis were met.

## **VI. Matrix Spike/(Matrix Spike) Duplicates**

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## **VII. Duplicate Sample Analysis**

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

## **VIII. Laboratory Control Samples (LCS)**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

#### **IX. Internal Standards (ICP-MS)**

ICP-MS was not utilized in this SDG.

#### **X. Furnace Atomic Absorption QC**

Graphite furnace atomic absorption was not utilized in this SDG.

#### **XI. ICP Serial Dilution**

ICP serial dilution analysis was not performed by the laboratory.

#### **XII. Sample Result Verification**

Raw data were not reviewed for this SDG.

#### **XIII. Overall Assessment of Data**

Data flags are summarized at the end of this report if data has been qualified.

#### **XIV. Field Duplicates**

No field duplicates were identified in this SDG.

**JOAAP-GW**

**Dissolved Metals - Data Qualification Summary - SDG 500-45519-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 500-45519-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Dissolved Metals - Field Blank Data Qualification Summary - SDG 500-45519-1**

No Sample Data Qualified in this SDG

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW802

Lab Sample ID: 500-45519-2

Date Sampled: 04/16/2012 1140

Client Matrix: Water

Date Received: 04/17/2012 1230

**6010B Metals (ICP)-Dissolved**

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-148076 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-147889 | Lab File ID:           | P50428B |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 04/28/2012 2307 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 04/27/2012 0930 |                 |            |                        |         |

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | <0.20         |           | 0.025   | 0.20   |
| Antimony  | <0.020        |           | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.026         |           | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | <0.0020       |           | 0.00054 | 0.0020 |
| Calcium   | 75            |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | 0.0012        | J         | 0.0011  | 0.010  |
| Iron      | <0.20         |           | 0.070   | 0.20   |
| Lead      | <0.0050       |           | 0.0016  | 0.0050 |
| Magnesium | 34            |           | 0.024   | 0.10   |
| Manganese | 0.75          |           | 0.0011  | 0.010  |
| Nickel    | 0.0023        | J         | 0.0019  | 0.010  |
| Potassium | 2.0           |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Sodium    | 19            |           | 0.12    | 1.0    |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | 0.0025        | J         | 0.00062 | 0.0050 |
| Zinc      | 0.0078        | J         | 0.0047  | 0.020  |

**7470A Mercury (CVAA)-Dissolved**

|                  |                 |                 |            |                        |             |
|------------------|-----------------|-----------------|------------|------------------------|-------------|
| Analysis Method: | 7470A           | Analysis Batch: | 500-147745 | Instrument ID:         | HG6         |
| Prep Method:     | 7470A           | Prep Batch:     | 500-147564 | Lab File ID:           | 042612R.CSV |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 25 mL       |
| Analysis Date:   | 04/26/2012 1121 |                 |            | Final Weight/Volume:   | 25 mL       |
| Prep Date:       | 04/25/2012 1000 |                 |            |                        |             |

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         |           | 0.070 | 0.20 |



**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW805

Lab Sample ID: 500-45519-3

Date Sampled: 04/16/2012 1235

Client Matrix: Water

Date Received: 04/17/2012 1230

**6010B Metals (ICP)-Dissolved**

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-148076 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-147889 | Lab File ID:           | P50428B |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 04/28/2012 2320 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 04/27/2012 0930 |                 |            |                        |         |

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | <0.20         |           | 0.025   | 0.20   |
| Antimony  | <0.020        |           | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.028         |           | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | <0.0020       |           | 0.00054 | 0.0020 |
| Calcium   | 110           |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | 0.0016        | J         | 0.0011  | 0.010  |
| Iron      | <0.20         |           | 0.070   | 0.20   |
| Lead      | <0.0050       |           | 0.0016  | 0.0050 |
| Magnesium | 75            |           | 0.024   | 0.10   |
| Manganese | <0.010        |           | 0.0011  | 0.010  |
| Nickel    | 0.0059        | J         | 0.0019  | 0.010  |
| Potassium | 9.5           |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | 0.0037        | J         | 0.00062 | 0.0050 |
| Zinc      | 0.0078        | J         | 0.0047  | 0.020  |

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-148076 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-147889 | Lab File ID:           | P50428B |
| Dilution:        | 10              |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 04/28/2012 2327 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 04/27/2012 0930 |                 |            |                        |         |

| Analyte | Result (mg/L) | Qualifier | MDL | RL |
|---------|---------------|-----------|-----|----|
| Sodium  | 97            |           | 1.2 | 10 |

**7470A Mercury (CVAA)-Dissolved**

|                  |                 |                 |            |                        |             |
|------------------|-----------------|-----------------|------------|------------------------|-------------|
| Analysis Method: | 7470A           | Analysis Batch: | 500-147745 | Instrument ID:         | HG6         |
| Prep Method:     | 7470A           | Prep Batch:     | 500-147564 | Lab File ID:           | 042612R.CSV |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 25 mL       |
| Analysis Date:   | 04/26/2012 1217 |                 |            | Final Weight/Volume:   | 25 mL       |
| Prep Date:       | 04/25/2012 1000 |                 |            |                        |             |

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         |           | 0.070 | 0.20 |

025/22/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW335

Lab Sample ID: 500-45519-4

Date Sampled: 04/16/2012 1325

Client Matrix: Water

Date Received: 04/17/2012 1230

**6010B Metals (ICP)-Dissolved**

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-148076 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-147889 | Lab File ID:           | P50428B |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 04/28/2012 2333 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 04/27/2012 0930 |                 |            |                        |         |

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | <0.20         |           | 0.025   | 0.20   |
| Antimony  | <0.020        |           | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.021         |           | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | <0.0020       |           | 0.00054 | 0.0020 |
| Calcium   | 210           |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | 0.0051        | J         | 0.0011  | 0.010  |
| Iron      | <0.20         |           | 0.070   | 0.20   |
| Lead      | <0.0050       |           | 0.0016  | 0.0050 |
| Magnesium | 140           |           | 0.024   | 0.10   |
| Manganese | <0.010        |           | 0.0011  | 0.010  |
| Nickel    | 0.0024        | J         | 0.0019  | 0.010  |
| Potassium | 6.4           |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Sodium    | 48            |           | 0.12    | 1.0    |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | 0.0047        | J         | 0.00062 | 0.0050 |
| Zinc      | 0.0047        | J         | 0.0047  | 0.020  |

**7470A Mercury (CVAA)-Dissolved**

|                  |                 |                 |            |                        |             |
|------------------|-----------------|-----------------|------------|------------------------|-------------|
| Analysis Method: | 7470A           | Analysis Batch: | 500-147745 | Instrument ID:         | HG6         |
| Prep Method:     | 7470A           | Prep Batch:     | 500-147564 | Lab File ID:           | 042612R.CSV |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 25 mL       |
| Analysis Date:   | 04/26/2012 1219 |                 |            | Final Weight/Volume:   | 25 mL       |
| Prep Date:       | 04/25/2012 1000 |                 |            |                        |             |

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         |           | 0.070 | 0.20 |

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GMMW336

Lab Sample ID: 500-45519-5

Client Matrix: Water

Date Sampled: 04/16/2012 1410

Date Received: 04/17/2012 1230

**6010B Metals (ICP)-Dissolved**

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-148076 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-147889 | Lab File ID:           | P50428B |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 04/28/2012 2346 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 04/27/2012 0930 |                 |            |                        |         |

| Analyte   | Result (mg/L) | Qualifier | MDL     | RL     |
|-----------|---------------|-----------|---------|--------|
| Aluminum  | <0.20         |           | 0.025   | 0.20   |
| Antimony  | <0.020        |           | 0.0026  | 0.020  |
| Arsenic   | <0.010        |           | 0.0024  | 0.010  |
| Barium    | 0.020         |           | 0.00044 | 0.010  |
| Beryllium | <0.0040       |           | 0.00044 | 0.0040 |
| Cadmium   | <0.0020       |           | 0.00054 | 0.0020 |
| Calcium   | 120           |           | 0.087   | 0.20   |
| Chromium  | <0.010        |           | 0.00096 | 0.010  |
| Cobalt    | <0.0050       |           | 0.0010  | 0.0050 |
| Copper    | 0.0011        | J         | 0.0011  | 0.010  |
| Iron      | 0.15          | J         | 0.070   | 0.20   |
| Lead      | <0.0050       |           | 0.0016  | 0.0050 |
| Magnesium | 80            |           | 0.024   | 0.10   |
| Manganese | 0.033         |           | 0.0011  | 0.010  |
| Nickel    | <0.010        |           | 0.0019  | 0.010  |
| Potassium | 4.1           |           | 0.070   | 0.50   |
| Selenium  | <0.010        |           | 0.0027  | 0.010  |
| Silver    | <0.0050       |           | 0.0011  | 0.0050 |
| Thallium  | <0.010        |           | 0.0013  | 0.010  |
| Vanadium  | 0.0040        | J         | 0.00062 | 0.0050 |
| Zinc      | 0.0069        | J         | 0.0047  | 0.020  |

|                  |                 |                 |            |                        |         |
|------------------|-----------------|-----------------|------------|------------------------|---------|
| Analysis Method: | 6010B           | Analysis Batch: | 500-148076 | Instrument ID:         | ICP5    |
| Prep Method:     | 3010A           | Prep Batch:     | 500-147889 | Lab File ID:           | P50428B |
| Dilution:        | 10              |                 |            | Initial Weight/Volume: | 50 mL   |
| Analysis Date:   | 04/28/2012 2352 |                 |            | Final Weight/Volume:   | 50 mL   |
| Prep Date:       | 04/27/2012 0930 |                 |            |                        |         |

| Analyte | Result (mg/L) | Qualifier | MDL | RL |
|---------|---------------|-----------|-----|----|
| Sodium  | 56            |           | 1.2 | 10 |

**7470A Mercury (CVAA)-Dissolved**

|                  |                 |                 |            |                        |             |
|------------------|-----------------|-----------------|------------|------------------------|-------------|
| Analysis Method: | 7470A           | Analysis Batch: | 500-147745 | Instrument ID:         | HG6         |
| Prep Method:     | 7470A           | Prep Batch:     | 500-147564 | Lab File ID:           | 042612R.CSV |
| Dilution:        | 1.0             |                 |            | Initial Weight/Volume: | 25 mL       |
| Analysis Date:   | 04/26/2012 1221 |                 |            | Final Weight/Volume:   | 25 mL       |
| Prep Date:       | 04/25/2012 1000 |                 |            |                        |             |

| Analyte | Result (ug/L) | Qualifier | MDL   | RL   |
|---------|---------------|-----------|-------|------|
| Mercury | <0.20         |           | 0.070 | 0.20 |

LDC #: 27649B4

## VALIDATION COMPLETENESS WORKSHEET

Date: 5-17-12

SDG #: 500-45519-1

Level III

Page: 1 of 1

Laboratory: Test America, Inc.

9M4.

Reviewer: MG

2nd Reviewer: ✓

METHOD: Dissolved Metals (EPA SW 846 Method 6010B/7000) 7470A

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                              |   | Comments                |
|-------|--|---|-------------------------|
| I.    | Technical holding times                      | A | Sampling dates: 4-16-12 |
| II.   | ICP/MS Tune                                  | N | not utilized            |
| III.  | Calibration                                  | A |                         |
| IV.   | Blanks                                       | A |                         |
| V.    | ICP Interference Check Sample (ICS) Analysis | A |                         |
| VI.   | Matrix Spike Analysis                        | N | client specified        |
| VII.  | Duplicate Sample Analysis                    | N |                         |
| VIII. | Laboratory Control Samples (LCS)             | A | LCS                     |
| IX.   | Internal Standard (ICP-MS)                   | N | not utilized            |
| X.    | Furnace Atomic Absorption QC                 | N | " "                     |
| XI.   | ICP Serial Dilution                          | N | not performed           |
| XII.  | Sample Result Verification                   | N |                         |
| XIII. | Overall Assessment of Data                   | A |                         |
| XIV.  | Field Duplicates                             | N |                         |
| XV.   | Field Blanks                                 | N |                         |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

all water

|    |                |    |     |    |  |    |  |
|----|----------------|----|-----|----|--|----|--|
| 1  | JP-M11-GWMW802 | 11 |     | 21 |  | 31 |  |
| 2  | JP-M11-GWMW805 | 12 |     | 22 |  | 32 |  |
| 3  | JP-M11-GWMW335 | 13 |     | 23 |  | 33 |  |
| 4  | JP-M11-GWMW336 | 14 |     | 24 |  | 34 |  |
| 5  |                | 15 |     | 25 |  | 35 |  |
| 6  |                | 16 |     | 26 |  | 36 |  |
| 7  |                | 17 |     | 27 |  | 37 |  |
| 8  |                | 18 |     | 28 |  | 38 |  |
| 9  |                | 19 |     | 29 |  | 39 |  |
| 10 |                | 20 | PBW | 30 |  | 40 |  |

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

All circled elements are applicable to each sample.

[illegible]

Comments: Mercury by CVAA if performed

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 16 through April 17, 2012  
**LDC Report Date:** May 18, 2012  
**Matrix:** Water  
**Parameters:** Wet Chemistry  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-45519-1

### Sample Identification

JP-M11-GWMW802  
JP-M11-GWMW805  
JP-M11-GWMW335  
JP-M11-GWMW336  
JP-M9-GWMW330  
JP-M9-GWMW330MS  
JP-M9-GWMW330MSD

## Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.0 for Dissolved Sulfate and Dissolved Nitrate as Nitrogen.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## **I. Technical Holding Times**

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## **II. Initial Calibration**

All criteria for the initial calibration were met.

## **III. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **IV. Blanks**

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

## **V. Matrix Spike/Matrix Spike Duplicates**

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## **VI. Duplicates**

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

## **VII. Laboratory Control Samples**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## **VIII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **IX. Overall Assessment of Data**

Data flags are summarized at the end of this report if data has been qualified.

## **X. Field Duplicates**

No field duplicates were identified in this SDG.

**JOAAP-GW**

**Dissolved Sulfate - Data Qualification Summary - SDG 500-45519-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Dissolved Sulfate - Laboratory Blank Data Qualification Summary - SDG 500-45519-1**

No Sample Data Qualified in this SDG

**JOAAP-GW**

**Dissolved Sulfate - Field Blank Data Qualification Summary - SDG 500-45519-1**

No Sample Data Qualified in this SDG

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

---

### General Chemistry

Client Sample ID: JP-M11-GWMW802

Lab Sample ID: 500-45519-2

Client Matrix: Water

Date Sampled: 04/16/2012 1140

Date Received: 04/17/2012 1230

| Analyte   | Result | Qual | Units | MDL   | RL   | Dil | Method |
|---|--------|------|-------|-------|------|-----|--------|
| Nitrate as N-Dissolved                                    | 0.11   |      | mg/L  | 0.023 | 0.10 | 1.0 | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/18/2012 1033 |        |      |       |       |      |     |        |
| Sulfate-Dissolved   | 85     |      | mg/L  | 0.90  | 2.0  | 10  | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/18/2012 1048 |        |      |       |       |      |     |        |

025/22/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

---

### General Chemistry

Client Sample ID: JP-M11-GWMW805

Lab Sample ID: 500-45519-3

Client Matrix: Water

Date Sampled: 04/16/2012 1235

Date Received: 04/17/2012 1230

| Analyte   | Result | Qual | Units | MDL   | RL   | Dil | Method |
|---|--------|------|-------|-------|------|-----|--------|
| Nitrate as N-Dissolved                                    | 0.22   |      | mg/L  | 0.023 | 0.10 | 1.0 | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/18/2012 1102 |        |      |       |       |      |     |        |
| Sulfate-Dissolved   | 470    |      | mg/L  | 9.0   | 20   | 100 | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/19/2012 0441 |        |      |       |       |      |     |        |

*05/12/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

---

### General Chemistry

Client Sample ID: JP-M11-GWMW335

Lab Sample ID: 500-45519-4

Client Matrix: Water

Date Sampled: 04/16/2012 1325

Date Received: 04/17/2012 1230

| Analyte   | Result | Qual | Units | MDL   | RL   | Dil | Method |
|---|--------|------|-------|-------|------|-----|--------|
| Nitrate as N-Dissolved                                    | 0.31   |      | mg/L  | 0.023 | 0.10 | 1.0 | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/18/2012 1131 |        |      |       |       |      |     |        |
| Sulfate-Dissolved   | 660    |      | mg/L  | 9.0   | 20   | 100 | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/19/2012 0456 |        |      |       |       |      |     |        |

025/22/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

---

### General Chemistry

Client Sample ID: JP-M11-GMMW336

Lab Sample ID: 500-45519-5

Client Matrix: Water

Date Sampled: 04/16/2012 1410

Date Received: 04/17/2012 1230

| Analyte   | Result | Qual | Units | MDL   | RL   | Dil | Method |
|---|--------|------|-------|-------|------|-----|--------|
| Nitrate as N-Dissolved                                    | 0.12   |      | mg/L  | 0.023 | 0.10 | 1.0 | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/18/2012 1159 |        |      |       |       |      |     |        |
| Sulfate-Dissolved   | 410    |      | mg/L  | 9.0   | 20   | 100 | 300.0  |
| Analysis Batch: 500-146885 Analysis Date: 04/19/2012 0510 |        |      |       |       |      |     |        |

025/22/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

---

### General Chemistry

Client Sample ID: JP-M9-GWMW330

Lab Sample ID: 500-45519-6

Client Matrix: Water

Date Sampled: 04/17/2012 1005

Date Received: 04/17/2012 1230


| Analyte           | Result | Qual | Units | MDL | RL | Dil | Method |
|-------------------|--------|------|-------|-----|----|-----|--------|
| Sulfate-Dissolved | 430    |      | mg/L  | 4.5 | 10 | 50  | 300.0  |

Analysis Batch: 500-147408 Analysis Date: 04/23/2012 1705

025/22/12

LDC #: 27649B6  
 SDG #: 500-45519-1  
 Laboratory: Test America, Inc.

# **VALIDATION COMPLETENESS WORKSHEET** Level III

Date: 5-17-12  
 Page: 1 of 1  
 Reviewer: MG  
 2nd Reviewer: 

**METHOD:** Dissolved Sulfate, Dissolved Nitrate-N(EPA Method 300.0)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                      |   | Comments                                |
|-------|--------------------------------------|---|---|
| I.    | Technical holding times              | A | Sampling dates: 4-16-12 through 4-17-12 |
| II.   | Initial calibration                  | A |   |
| III.  | Calibration verification             | A |   |
| IV.   | Blanks                               | A |   |
| V.    | Matrix Spike/Matrix Spike Duplicates | A | MS/MSD                                  |
| VI.   | Duplicates                           | N |   |
| VII.  | Laboratory control samples           | A | LCS                                     |
| VIII. | Sample result verification           | N |   |
| IX.   | Overall assessment of data           | A |   |
| X.    | Field duplicates                     | N |   |
| XI.   | Field blanks                         | N |   |

Note: A = Acceptable  
 N = Not provided/applicable  
 SW = See worksheet

ND = No compounds detected  
 R = Rinsate  
 FB = Field blank

D = Duplicate  
 TB = Trip blank  
 EB = Equipment blank

Validated Samples:  
 all water

|     |                  |      |      |    |  |    |  |
|-----|------------------|------|------|----|--|----|--|
| 1   | JP-M11-GWMW802   | 11   |      | 21 |  | 31 |  |
| 2   | JP-M11-GWMW805   | 12   |      | 22 |  | 32 |  |
| 3   | JP-M11-GWMW335   | 13   |      | 23 |  | 33 |  |
| 4   | JP-M11-GWMW336   | 14   |      | 24 |  | 34 |  |
| 5 2 | JP-M9-GWMW330    | 15   |      | 25 |  | 35 |  |
| 6 2 | JP-M9-GWMW330MS  | 16   |      | 26 |  | 36 |  |
| 7 2 | JP-M9-GWMW330MSD | 17   |      | 27 |  | 37 |  |
| 8   |                  | 18   |      | 28 |  | 38 |  |
| 9   |                  | 19 1 | PBW1 | 29 |  | 39 |  |
| 10  |                  | 20 2 | PBW2 | 30 |  | 40 |  |

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

LDC #: 27649B6

## VALIDATION FINDINGS WORKSHEET

### Sample Specific Analysis Reference

Page: 1 of 1

Reviewer: MG

2nd reviewer: W

**All circled methods are applicable to each sample.**

[illegible]

Comments: \_\_\_\_\_

**Laboratory Data Consultants, Inc.  
Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 15 through April 16, 2012  
**LDC Report Date:** May 24, 2012  
**Matrix:** Water  
**Parameters:** Explosives  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-45519-1

**Sample Identification**

JP-M06-GWMW654  
JP-M11-GWMW802  
JP-M11-GWMW805  
JP-M11-GWMW335  
JP-M11-GWMW336  
JP-M11-GWMW336MS  
JP-M11-GWMW336MSD

## Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330 for Explosives.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

Initial calibration of compounds was performed for the primary (quantitation) column and confirmation column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

## III. Continuing Calibration

Continuing calibration was performed at the required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits with the following exceptions:

| Date    | Column | Compound              | %D   | Associated Samples             | Flag                                    | A or P |
|---------|--------|-----------------------|------|--------------------------------|---|--------|
| 4/20/12 | L3uPH  | 2,4,6-Trinitrotoluene | 16.6 | All samples in SDG 500-45519-1 | J (all detects)<br>UJ (all non-detects) | A      |

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No explosive contaminants were found in the method blanks.

No field blanks were identified in this SDG.

## V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## VIII. Target Compound Identification

Raw data were not reviewed for this SDG.

## IX. Compound Quantitation and RLs

The sample results for detected compounds from the two columns were within 40% difference with the following exceptions:

| Sample         | Compound              | %D             | Flag                               | A or P |
|----------------|-----------------------|----------------|------------------------------------|--------|
| JP-M06-GWMW654 | RDX<br>3-Nitrotoluene | 182.3<br>149.1 | J (all detects)<br>J (all detects) | A      |

Raw data were not reviewed for this SDG.

## X. System Performance

Raw data were not reviewed for this SDG.

## XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XII. Field Duplicates

No field duplicates were identified in this SDG.

**JOAAP-GW****Explosives - Data Qualification Summary - SDG 500-45519-1**

| SDG         | Sample   | Compound              | Flag                                    | A or P | Reason  |
|-------------|--|-----------------------|---|--------|---|
| 500-45519-1 | JP-M06-GWMW654<br>JP-M11-GWMW802<br>JP-M11-GWMW805<br>JP-M11-GWMW335<br>JP-M11-GWMW336 | 2,4,6-Trinitrotoluene | J (all detects)<br>UJ (all non-detects) | A      | Continuing calibration (%D)                       |
| 500-45519-1 | JP-M06-GWMW654   | RDX<br>3-Nitrotoluene | J (all detects)<br>J (all detects)      | A      | Compound quantitation and RLs (column difference) |

**JOAAP-GW****Explosives - Laboratory Blank Data Qualification Summary - SDG 500-45519-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Explosives - Field Blank Data Qualification Summary - SDG 500-45519-1**

No Sample Data Qualified in this SDG

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M06-GWMW654

Lab Sample ID: 500-45519-1

Date Sampled: 04/15/2012 1247

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146863 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-147010     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/20/2012 2249 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/19/2012 2030     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL               | RL   |
|----------------------------|---------------|-----------|-------------------|------|
| HMX                        | <0.31         |           | 0.12              | 0.31 |
| RDX                        | 0.31 J        |           | 0.077             | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039             | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033             | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032             | 0.16 |
| 2,4,6-Trinitrotoluene      | 0.18 J        |           | 0.036             | 0.16 |
| Tetryl                     | <0.39         |           | 0.065             | 0.39 |
| 2,4-Dinitrotoluene         | 1.7           |           | 0.032             | 0.31 |
| 2,6-Dinitrotoluene         | 0.97          |           | 0.071             | 0.31 |
| 2-Amino-4,6-dinitrotoluene | 0.70          |           | 0.035             | 0.31 |
| 4-Amino-2,6-dinitrotoluene | 2.2           |           | 0.074             | 0.31 |
| 4-Nitrotoluene             | 11            |           | 0.082             | 0.31 |
| 3-Nitrotoluene             | 0.23 J        | J         | 0.14              | 0.31 |
| Surrogate                  | %Rec          | Qualifier | Acceptance Limits |      |
| 1,2-Dinitrobenzene         | 107           |           | 70 - 130          |      |

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M06-GWMW654

Lab Sample ID: 500-45519-1

Date Sampled: 04/15/2012 1247

Client Matrix: Water

Date Received: 04/17/2012 1230

### 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146863 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-147010 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 10              |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/21/2012 1104 | Run Type:       | DL         | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/19/2012 2030 |                 |            | Result Type:           | PRIMARY   |

| Analyte        | Result (ug/L) | Qualifier | MDL  | RL  |
|----------------|---------------|-----------|------|-----|
| 2-Nitrotoluene | 18            |           | 0.82 | 3.1 |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GMMW802

Lab Sample ID: 500-45519-2

Date Sampled: 04/16/2012 1140

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146863 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-147010     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/20/2012 2341 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/19/2012 2030     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         | US        | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 107  |           | 70 - 130          |

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW805

Lab Sample ID: 500-45519-3

Date Sampled: 04/16/2012 1235

Client Matrix: Water

Date Received: 04/17/2012 1230

### 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-146863 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-147010 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 04/21/2012 0108 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/19/2012 2030 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL               | RL   |
|----------------------------|---------------|-----------|-------------------|------|
| HMX                        | <0.31         |           | 0.12              | 0.31 |
| RDX                        | <0.16         |           | 0.077             | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039             | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033             | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032             | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16 JS      |           | 0.036             | 0.16 |
| Tetryl                     | <0.39         |           | 0.065             | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032             | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071             | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035             | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074             | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082             | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082             | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14              | 0.31 |
| Surrogate                  | %Rec          | Qualifier | Acceptance Limits |      |
| 1,2-Dinitrobenzene         | 98            |           | 70 - 130          |      |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW335

Lab Sample ID: 500-45519-4

Date Sampled: 04/16/2012 1325

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146863 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-147010     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/21/2012 0200 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/19/2012 2030     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 101  |           | 70 - 130          |

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45519-1

Client Sample ID: JP-M11-GWMW336

Lab Sample ID: 500-45519-5

Date Sampled: 04/16/2012 1410

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-146863 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-147010     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 04/21/2012 0251 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/19/2012 2030     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL               | RL   |
|----------------------------|---------------|-----------|-------------------|------|
| HMX                        | <0.31         |           | 0.12              | 0.31 |
| RDX                        | <0.16         |           | 0.077             | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039             | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033             | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032             | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16 JS      |           | 0.036             | 0.16 |
| Tetryl                     | <0.39         |           | 0.065             | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032             | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071             | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035             | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074             | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082             | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082             | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14              | 0.31 |
| Surrogate                  | %Rec          | Qualifier | Acceptance Limits |      |
| 1,2-Dinitrobenzene         | 101           |           | 70 - 130          |      |

LDC #: 27649B40  
SDG #: 500-45519-1  
Laboratory: Test America, Inc.

# VALIDATION COMPLETENESS WORKSHEET Level III

Date: 5/22/12  
Page: 1 of 1  
Reviewer: MA  
2nd Reviewer: Q

**METHOD:** HPLC Explosives (EPA SW 846 Method 8330)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                      |       | Comments                     |
|-------|--------------------------------------|-------|------------------------------|
| I.    | Technical holding times              | A     | Sampling dates: 4/15-4/16/12 |
| II.   | Initial calibration                  | A     | 1-RSD $\leq$ 20%.            |
| III.  | Calibration verification/ICV         | SW    | 1-D $\leq$ 15%, 1cv/cav      |
| IV.   | Blanks                               | A     |                              |
| V.    | Surrogate recovery                   | SWA   |                              |
| VI.   | Matrix spike/Matrix spike duplicates | AA SW | MS/D                         |
| VII.  | Laboratory control samples           | SWA   | LCS                          |
| VIII. | Target compound identification       | N     |                              |
| IX.   | Compound quantitation/RL/LOQ/LODs    | SWA   |                              |
| X.    | System Performance                   | N     |                              |
| XI.   | Overall assessment of data           | A     |                              |
| XII.  | Field duplicates                     | N     |                              |
| XIII. | Field blanks                         | N     |                              |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples: WATER

|    |                   |    |           |    |  |    |  |
|----|-------------------|----|-----------|----|--|----|--|
| 1  | JP-M06-GWMW654    | 11 | 147010 MB | 21 |  | 31 |  |
| 2  | JP-M11-GWMW802    | 12 |           | 22 |  | 32 |  |
| 3  | JP-M11-GWMW805    | 13 |           | 23 |  | 33 |  |
| 4  | JP-M11-GWMW335    | 14 |           | 24 |  | 34 |  |
| 5  | JP-M11-GWMW336    | 15 |           | 25 |  | 35 |  |
| 6  | JP-M11-GWMW336MS  | 16 |           | 26 |  | 36 |  |
| 7  | JP-M11-GWMW336MSD | 17 |           | 27 |  | 37 |  |
| 8  |                   | 18 |           | 28 |  | 38 |  |
| 9  |                   | 19 |           | 29 |  | 39 |  |
| 10 |                   | 20 |           | 30 |  | 40 |  |

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# VALIDATION FINDINGS WORKSHEET

METHOD: GC / HPLC

| 8310                      | 8330                          | 8151                 | 8141                | 8141(Con't)           | 8021B             |
|---------------------------|-------------------------------|----------------------|---------------------|-----------------------|-------------------|
| A. Acenaphthene           | A. HMX                        | A. 2,4-D             | A. Dichlorvos       | V. Fensulfothion      | V. Benzene        |
| B. Acenaphthylene         | B. RDX                        | B. 2,4-DB            | B. Mevinphos        | W. Bolstar            | CC. Toluene       |
| C. Anthracene             | C. 1,3,5-Trinitrobenzene      | C. 2,4,5-T           | C. Demeton-O        | X. EPN                | EE. Ethyl Benzene |
| D. Benzo(a)anthracene     | D. 1,3-Dinitrobenzene         | D. 2,4,5-TP          | D. Demeton-S        | Y. Azinphos-methyl    | SSS. O-Xylene     |
| E. Benzo(a)pyrene         | E. Tetrl                      | E. Dinoseb           | E. Ethoprop         | Z. Coumaphos          | RRR. MP-Xylene    |
| F. Benzo(b)fluoranthene   | F. Nitrobenzene               | F. Dichlorprop       | F. Naled            | AA. Parathion         | GG. Total Xylene  |
| G. Benzo(g,h,i)perylene   | G. 2,4,6-Trinitrotoluene      | G. Dicamba           | G. Sulfotep         | BB. Trichloronate     |                   |
| H. Benzo(k)fluoranthene   | H. 4-Amino-2,6-dinitrotoluene | H. Dalapon           | H. Phorate          | CC. Trichlorinate     |                   |
| I. Chrysene               | I. 2-Amino-4,6-dinitrotoluene | I. MCP               | I. Dimethoate       | DD. Trifluralin       |                   |
| J. Dibenzo(a,h)anthracene | J. 2,4-Dinitrotoluene         | J. MCPA              | J. Diazinon         | EE. Def               |                   |
| K. Fluoranthene           | K. 2,6-Dinitrotoluene         | K. Pentachlorophenol | K. Disulfoton       | FF. Prowl             |                   |
| L. Fluorene               | L. 2-Nitrotoluene             | L. 2,4,5-TP (silvex) | L. Parathion-methyl | GG. Ethion            |                   |
| M. Indeno(1,2,3-cd)pyrene | M. 3-Nitrotoluene             | M. Silvex            | M. Ronnel           | HH. Famphur           |                   |
| N. Naphthalene            | N. 4-Nitrotoluene             |                      | N. Malathion        | II. Phosmet           |                   |
| O. Phenanthrene           | O. Nitroglycerin              |                      | O. Chlorpyrifos     | JJ. Tetrachlorvinphos |                   |
| P. Pyrene                 | P.                            |                      | P. Fenthion         | KK. Demeton (total)   |                   |
| Q.                        | Q                             |                      | Q. Parathion-ethyl  |                       |                   |
| R.                        |                               |                      | R. Trichlorinate    |                       |                   |
| S.                        |                               |                      | S. Merphos          |                       |                   |
|                           |                               |                      | T. Stirofos         |                       |                   |
|                           |                               |                      | U. Tokuthion        |                       |                   |

Notes:

# VALIDATION FINDINGS WORKSHEET

## Continuing Calibration

GC ☒ HPLC

indications below for all questions answered "N". Not applicable questions are identified as "N/A".

Continuing calibration calculation was performed? ☒ %D or ☐ %R

Were continuing calibration standards analyzed at the required frequencies?

Did the continuing calibration standards meet the %D / %R validation criteria of  $\leq 20.0\%$  /  $80-120\%$ ?

Were the retention times for all calibrated compounds within their respective acceptance windows?

What type of continuing calibration calculation was performed? —%D or —%R

Did the continuing calibration standards meet the %D / %R validation criteria

Did the continuing calibration standards meet the %D / %R validation criteria of  $\leq 20.0\%$  /  $80-120\%$ ?

[illegible]

**Were the retention times for all calibrated compounds within their respective acceptance windows?**

[illegible]

## VALIDATION FINDINGS WORKSHEET

### Compound Quantitation and Reported CRQLs

Page: 1 of 1  
 Reviewer: AG  
 2nd Reviewer: [Signature]

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N K/A

|   |   |     |
|---|---|-----|
| Y | N | N/A |
|---|---|-----|

|   |   |     |
|---|---|-----|
| Y | N | N/A |
|---|---|-----|

If no, please see findings below.

[illegible]

Comments:

## **Laboratory Data Consultants, Inc. Data Validation Report**

**Project/Site Name:** JOAAP-GW  
**Collection Date:** April 14 through April 15, 2012  
**LDC Report Date:** May 25, 2012  
**Matrix:** Water  
**Parameters:** Explosives  
**Validation Level:** EPA Level III  
**Laboratory:** TestAmerica, Inc.  
**Sample Delivery Group (SDG):** 500-45521-1

### **Sample Identification**

JP-M06-GWMW123R  
JP-M07-GWMW124R  
JP-M06-GWMW162R  
JP-M06-GWMW212R  
JP-M06-GWMW995  
JP-M06-GWMW313  
JP-M06-GWMW318  
JP-M06-GWMW319  
JP-M06-GWMW652  
JP-M06-GWMW994

## Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8330 for Explosives.

This review follows the Joliet Army Ammunition Plant (JOAAP) Quality Assurance Project Plan (QAPP) for Long Term Monitoring, prepared by MWH Americas, Inc. (Rev. 0 July 2009), the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (April 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- NJ Presumptive evidence of presence of the compound at an estimated quantity.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

Initial calibration of compounds was performed for the primary (quantitation) column and confirmation column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

## III. Continuing Calibration

Continuing calibration was performed at the required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No explosive contaminants were found in the method blanks.

No field blanks were identified in this SDG.

## V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

| Sample         | Surrogate          | %R (Limits)  | Compound          | Flag            | A or P |
|----------------|--------------------|--------------|-------------------|-----------------|--------|
| JP-M06-GWMW318 | 1,2-Dinitrobenzene | 201 (54-148) | All TCL compounds | J (all detects) | P      |

## VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VIII. Target Compound Identification

Raw data were not reviewed for this SDG.

## IX. Compound Quantitation and RLs

The sample results for detected compounds from the two columns were within 40% difference with the following exceptions:

| Sample          | Compound   | %D             | Flag                               | A or P |
|-----------------|--|----------------|------------------------------------|--------|
| JP-M06-GWMW162R | 2,4-Dinitrotoluene                                       | 113.0          | J (all detects)                    | A      |
| JP-M06-GWMW212R | 4-Amino-2,6-dinitrotoluene<br>2-Amino-4,6-dinitrotoluene | 61.5<br>60.2   | J (all detects)<br>J (all detects) | A      |
| JP-M06-GWMW318  | 2,6-Dinitrotoluene<br>2,4-Dinitrotoluene                 | 146.1<br>176.1 | J (all detects)<br>J (all detects) | A      |
| JP-M06-GWMW319  | 2,4,6-Trinitrotoluene                                    | 129.6          | J (all detects)                    | A      |
| JP-M06-GWMW652  | 4-Amino-2,6-dinitrotoluene                               | 67.5           | J (all detects)                    | A      |
| JP-M06-GWMW994  | 4-Amino-2,6-dinitrotoluene<br>4-Nitrotoluene             | 71.9<br>57.2   | J (all detects)<br>J (all detects) | A      |

Raw data were not reviewed for this SDG.

## X. System Performance

Raw data were not reviewed for this SDG.

## XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XII. Field Duplicates

Samples JP-M06-GWMW123R and JP-M06-GWMW995 and samples JP-M06-GWMW652 and JP-M06-GWMW994 were identified as field duplicates. No explosives were detected in any of the samples with the following exceptions:

| Compound                   | Concentration (ug/L) |                | RPD<br>(Limits) | Difference<br>(Limits) | Flags | A or P |
|----------------------------|----------------------|----------------|-----------------|------------------------|-------|--------|
|                            | JP-M06-GWMW652       | JP-M06-GWMW994 |                 |                        |       |        |
| 1,3-Dinitrobenzene         | 9.5                  | 7.9            | -               | 1.6 (≤80)              | -     | -      |
| 2,4,6-Trinitrotoluene      | 1600                 | 1300           | 21 (≤25)        | -                      | -     | -      |
| 2,4-Dinitrotoluene         | 8400                 | 6800           | 21 (≤25)        | -                      | -     | -      |
| 2,6-Dinitrotoluene         | 3300                 | 2700           | 20 (≤25)        | -                      | -     | -      |
| 2-Amino-4,6-dinitrotoluene | 360                  | 320            | 12 (≤25)        | -                      | -     | -      |
| 4-Amino-4,6-dinitrotoluene | 380                  | 320            | 17 (≤25)        | -                      | -     | -      |
| 2-Nitrotoluene             | 44000                | 35000          | 23 (≤25)        | -                      | -     | -      |
| 4-Nitrotoluene             | 28000                | 22000          | 24 (≤25)        | -                      | -     | -      |

**JOAAP-GW****Explosives - Data Qualification Summary - SDG 500-45521-1**

| SDG         | Sample          | Compound   | Flag                               | A or P | Reason                             |
|-------------|-----------------|--|------------------------------------|--------|------------------------------------|
| 500-45521-1 | JP-M06-GWMW318  | All TCL compounds  | J (all detects)                    | P      | Surrogate spikes (%R)              |
| 500-45521-1 | JP-M06-GWMW162R | 2,4-Dinitrotoluene                                       | J (all detects)                    | A      | Compound quantitation and RLs (%D) |
| 500-45521-1 | JP-M06-GWMW212R | 4-Amino-2,6-dinitrotoluene<br>2-Amino-4,6-dinitrotoluene | J (all detects)<br>J (all detects) | A      | Compound quantitation and RLs (%D) |
| 500-45521-1 | JP-M06-GWMW318  | 2,6-Dinitrotoluene<br>2,4-Dinitrotoluene                 | J (all detects)<br>J (all detects) | A      | Compound quantitation and RLs (%D) |
| 500-45521-1 | JP-M06-GWMW319  | 2,4,6-Trinitrotoluene                                    | J (all detects)                    | A      | Compound quantitation and RLs (%D) |
| 500-45521-1 | JP-M06-GWMW652  | 4-Amino-2,6-dinitrotoluene                               | J (all detects)                    | A      | Compound quantitation and RLs (%D) |
| 500-45521-1 | JP-M06-GWMW994  | 4-Amino-2,6-dinitrotoluene<br>4-Nitrotoluene             | J (all detects)<br>J (all detects) | A      | Compound quantitation and RLs (%D) |

**JOAAP-GW****Explosives - Laboratory Blank Data Qualification Summary - SDG 500-45521-1**

No Sample Data Qualified in this SDG

**JOAAP-GW****Explosives - Field Blank Data Qualification Summary - SDG 500-45521-1**

No Sample Data Qualified in this SDG

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW123R

Lab Sample ID: 500-45521-1

Date Sampled: 04/14/2012 1000

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-148612 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-146956     | Initial Weight/Volume: 770 mL |
| Dilution: 1.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 05/03/2012 1949 |                            | Injection Volume: 100 µL      |
| Prep Date: 04/19/2012 1030     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL               | RL   |
|----------------------------|---------------|-----------|-------------------|------|
| HMX                        | <0.31         |           | 0.12              | 0.31 |
| RDX                        | <0.16         |           | 0.077             | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039             | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033             | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032             | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036             | 0.16 |
| Tetryl                     | <0.39         |           | 0.065             | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032             | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071             | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035             | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074             | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082             | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082             | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14              | 0.31 |
| Surrogate                  | %Rec          | Qualifier | Acceptance Limits |      |
| 1,2-Dinitrobenzene         | 98            |           | 70 - 130          |      |

025/30/12

**Analytical Data**

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M07-GWMW124R

Lab Sample ID: 500-45521-2

Date Sampled: 04/14/2012 1138

Client Matrix: Water

Date Received: 04/17/2012 1230

**8330 Nitroaromatics and Nitramines (HPLC)**

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-148612 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146956 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 05/03/2012 2041 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/19/2012 1030 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 98   |           | 70 - 130          |

ces/30/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW162R

Lab Sample ID: 500-45521-3

Date Sampled: 04/14/2012 1045

Client Matrix: Water

Date Received: 04/17/2012 1230

### 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-148612 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146956 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 05/03/2012 2132 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/19/2012 1030 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | 0.27 <i>S</i> | J         | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | 0.14          | J         | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | 0.70          |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 104  |           | 70 - 130          |

*025/30/12*

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW212R

Lab Sample ID: 500-45521-4

Date Sampled: 04/15/2012 1105

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-148612 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-146956     | Initial Weight/Volume: 770 mL |
| Dilution: 10                   |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 05/03/2012 2224 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/19/2012 1030     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL  | RL  |
|----------------------------|---------------|-----------|------|-----|
| HMX                        | <3.1          |           | 1.2  | 3.1 |
| RDX                        | <1.6          |           | 0.77 | 1.6 |
| 1,3,5-Trinitrobenzene      | <1.6          |           | 0.39 | 1.6 |
| 1,3-Dinitrobenzene         | 1.1           | J         | 0.33 | 1.6 |
| Nitrobenzene               | 1.9           |           | 0.32 | 1.6 |
| 2,4,6-Trinitrotoluene      | 39            |           | 0.36 | 1.6 |
| Tetryl                     | <3.9          |           | 0.65 | 3.9 |
| 2-Amino-4,6-dinitrotoluene | 64            |           | 0.35 | 3.1 |
| 4-Amino-2,6-dinitrotoluene | 51            |           | 0.74 | 3.1 |
| 3-Nitrotoluene             | <3.1          |           | 1.4  | 3.1 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 71   |           | 70 - 130          |

025/30/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW212R

Lab Sample ID: 500-45521-4

Date Sampled: 04/15/2012 1105

Client Matrix: Water

Date Received: 04/17/2012 1230

### 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-148612 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146956 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 100             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 05/03/2012 2315 | Run Type:       | DL         | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/19/2012 1030 |                 |            | Result Type:           | PRIMARY   |

| Analyte            | Result (ug/L) | Qualifier | MDL | RL |
|--------------------|---------------|-----------|-----|----|
| 2,4-Dinitrotoluene | 620           |           | 3.2 | 31 |
| 2,6-Dinitrotoluene | 260           |           | 7.1 | 31 |

05/30/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW212R

Lab Sample ID: 500-45521-4

Date Sampled: 04/15/2012 1105

Client Matrix: Water

Date Received: 04/17/2012 1230

### 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-148612 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146956 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 500             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 05/04/2012 0007 | Run Type:       | DL2        | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/19/2012 1030 |                 |            | Result Type:           | PRIMARY   |

| Analyte        | Result (ug/L) | Qualifier | MDL | RL  |
|----------------|---------------|-----------|-----|-----|
| 2-Nitrotoluene | 4100          |           | 41  | 160 |
| 4-Nitrotoluene | 2100          |           | 41  | 160 |

025/30/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW995

Lab Sample ID: 500-45521-5

Date Sampled: 04/14/2012 1200

Client Matrix: Water

Date Received: 04/17/2012 1230

### 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-148612 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146956 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 05/04/2012 0059 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/19/2012 1030 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 104  |           | 70 - 130          |

025/30/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GMMW313

Lab Sample ID: 500-45521-6

Date Sampled: 04/15/2012 1326

Client Matrix: Water

Date Received: 04/17/2012 1230

### 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-148612 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146956 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1.0             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 05/04/2012 0242 |                 |            | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/19/2012 1030 |                 |            | Result Type:           | PRIMARY   |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.31         |           | 0.12  | 0.31 |
| RDX                        | <0.16         |           | 0.077 | 0.16 |
| 1,3,5-Trinitrobenzene      | <0.16         |           | 0.039 | 0.16 |
| 1,3-Dinitrobenzene         | <0.16         |           | 0.033 | 0.16 |
| Nitrobenzene               | <0.16         |           | 0.032 | 0.16 |
| 2,4,6-Trinitrotoluene      | <0.16         |           | 0.036 | 0.16 |
| Tetryl                     | <0.39         |           | 0.065 | 0.39 |
| 2,4-Dinitrotoluene         | <0.31         |           | 0.032 | 0.31 |
| 2,6-Dinitrotoluene         | <0.31         |           | 0.071 | 0.31 |
| 2-Amino-4,6-dinitrotoluene | <0.31         |           | 0.035 | 0.31 |
| 4-Amino-2,6-dinitrotoluene | <0.31         |           | 0.074 | 0.31 |
| 2-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 4-Nitrotoluene             | <0.31         |           | 0.082 | 0.31 |
| 3-Nitrotoluene             | <0.31         |           | 0.14  | 0.31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 96   |           | 70 - 130          |

025/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW318

Lab Sample ID: 500-45521-7

Date Sampled: 04/14/2012 1300

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-148612 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-146956     | Initial Weight/Volume: 770 mL |
| Dilution: 2.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 05/04/2012 0334 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/19/2012 1030     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.62         |           | 0.24  | 0.62 |
| RDX                        | <0.32         |           | 0.15  | 0.32 |
| 1,3,5-Trinitrobenzene      | <0.32         |           | 0.078 | 0.32 |
| 1,3-Dinitrobenzene         | <0.32         |           | 0.066 | 0.32 |
| Nitrobenzene               | <0.32         |           | 0.064 | 0.32 |
| 2,4,6-Trinitrotoluene      | <0.32         |           | 0.072 | 0.32 |
| Tetryl                     | <0.78         |           | 0.13  | 0.78 |
| 2,4-Dinitrotoluene         | 0.21 J        | J         | 0.064 | 0.62 |
| 2,6-Dinitrotoluene         | 0.45 J        | J         | 0.14  | 0.62 |
| 2-Amino-4,6-dinitrotoluene | <0.62         |           | 0.070 | 0.62 |
| 4-Amino-2,6-dinitrotoluene | <0.62         |           | 0.15  | 0.62 |
| 2-Nitrotoluene             | <0.62         |           | 0.16  | 0.62 |
| 4-Nitrotoluene             | <0.62         |           | 0.16  | 0.62 |
| 3-Nitrotoluene             | <0.62         |           | 0.27  | 0.62 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 201  | X         | 70 - 130          |

025/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GMMW319

Lab Sample ID: 500-45521-8

Date Sampled: 04/14/2012 1225

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-148612 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-146956     | Initial Weight/Volume: 770 mL |
| Dilution: 2.0                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 05/04/2012 0425 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/19/2012 1030     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL   | RL   |
|----------------------------|---------------|-----------|-------|------|
| HMX                        | <0.62         |           | 0.24  | 0.62 |
| RDX                        | <0.32         |           | 0.15  | 0.32 |
| 1,3,5-Trinitrobenzene      | <0.32         |           | 0.078 | 0.32 |
| 1,3-Dinitrobenzene         | <0.32         |           | 0.066 | 0.32 |
| Nitrobenzene               | <0.32         |           | 0.064 | 0.32 |
| 2,4,6-Trinitrotoluene      | 0.29 J        | J         | 0.072 | 0.32 |
| Tetryl                     | <0.78         |           | 0.13  | 0.78 |
| 2,4-Dinitrotoluene         | <0.62         |           | 0.064 | 0.62 |
| 2,6-Dinitrotoluene         | <0.62         |           | 0.14  | 0.62 |
| 2-Amino-4,6-dinitrotoluene | <0.62         |           | 0.070 | 0.62 |
| 4-Amino-2,6-dinitrotoluene | <0.62         |           | 0.15  | 0.62 |
| 2-Nitrotoluene             | <0.62         |           | 0.16  | 0.62 |
| 4-Nitrotoluene             | <0.62         |           | 0.16  | 0.62 |
| 3-Nitrotoluene             | <0.62         |           | 0.27  | 0.62 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 100  |           | 70 - 130          |

025/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW652

Lab Sample ID: 500-45521-9

Date Sampled: 04/14/2012 1355

Client Matrix: Water

Date Received: 04/17/2012 1230

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-148612 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-146956     | Initial Weight/Volume: 770 mL |
| Dilution: 100                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 05/04/2012 0608 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/19/2012 1030     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL | RL |
|----------------------------|---------------|-----------|-----|----|
| HMX                        | <31           |           | 12  | 31 |
| RDX                        | <16           |           | 7.7 | 16 |
| 1,3,5-Trinitrobenzene      | <16           |           | 3.9 | 16 |
| 1,3-Dinitrobenzene         | 9.5           | J         | 3.3 | 16 |
| Nitrobenzene               | <16           |           | 3.2 | 16 |
| Tetryl                     | <39           |           | 6.5 | 39 |
| 2-Amino-4,6-dinitrotoluene | 360           |           | 3.5 | 31 |
| 4-Amino-2,6-dinitrotoluene | 380 <i>S</i>  |           | 7.4 | 31 |
| 3-Nitrotoluene             | <31           |           | 14  | 31 |

| Surrogate          | %Rec | Qualifier | Acceptance Limits |
|--------------------|------|-----------|-------------------|
| 1,2-Dinitrobenzene | 0    | D         | 70 - 130          |

*025/30/12*

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW652

Lab Sample ID: 500-45521-9

Date Sampled: 04/14/2012 1355

Client Matrix: Water

Date Received: 04/17/2012 1230

### 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-148612 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146956 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 500             |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 05/04/2012 0700 | Run Type:       | DL         | Injection Volume:      | 100 uL    |
| Prep Date:       | 04/19/2012 1030 |                 |            | Result Type:           | PRIMARY   |

| Analyte               | Result (ug/L) | Qualifier | MDL | RL  |
|-----------------------|---------------|-----------|-----|-----|
| 2,4,6-Trinitrotoluene | 1600          |           | 18  | 80  |
| 2,6-Dinitrotoluene    | 3300          |           | 36  | 160 |

QES/30/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW652

Lab Sample ID: 500-45521-9

Client Matrix: Water

Date Sampled: 04/14/2012 1355

Date Received: 04/17/2012 1230

### 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-148612 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-146956     | Initial Weight/Volume: 770 mL |
| Dilution: 2000                 |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 05/04/2012 1304 | Run Type: DL2              | Injection Volume: 100 µL      |
| Prep Date: 04/19/2012 1030     |                            | Result Type: PRIMARY          |

| Analyte            | Result (ug/L) | Qualifier | MDL | RL  |
|--------------------|---------------|-----------|-----|-----|
| 2,4-Dinitrotoluene | 8400          |           | 64  | 620 |
| 4-Nitrotoluene     | 28000         |           | 160 | 620 |

025/30/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW652

Lab Sample ID: 500-45521-9

Client Matrix: Water

Date Sampled: 04/14/2012 1355

Date Received: 04/17/2012 1230

### 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-148612 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-146956     | Initial Weight/Volume: 770 mL |
| Dilution: 10000                |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 05/07/2012 1331 | Run Type: DL3              | Injection Volume: 100 uL      |
| Prep Date: 04/19/2012 1030     |                            | Result Type: PRIMARY          |

| Analyte        | Result (ug/L) | Qualifier | MDL | RL   |
|----------------|---------------|-----------|-----|------|
| 2-Nitrotoluene | 44000         |           | 820 | 3100 |

CES/30/12

# Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW994

Lab Sample ID: 500-45521-10

Client Matrix: Water

Date Sampled: 04/14/2012 1200

Date Received: 04/17/2012 1230

## 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-148612 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-146956     | Initial Weight/Volume: 770 mL |
| Dilution: 100                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 05/04/2012 0843 |                            | Injection Volume: 100 uL      |
| Prep Date: 04/19/2012 1030     |                            | Result Type: PRIMARY          |

| Analyte                    | Result (ug/L) | Qualifier | MDL               | RL |
|----------------------------|---------------|-----------|-------------------|----|
| HMX                        | <31           |           | 12                | 31 |
| RDX                        | <16           |           | 7.7               | 16 |
| 1,3,5-Trinitrobenzene      | <16           |           | 3.9               | 16 |
| 1,3-Dinitrobenzene         | 7.9           | J         | 3.3               | 16 |
| Nitrobenzene               | <16           |           | 3.2               | 16 |
| Tetryl                     | <39           |           | 6.5               | 39 |
| 2-Amino-4,6-dinitrotoluene | 320           |           | 3.5               | 31 |
| 4-Amino-2,6-dinitrotoluene | 320 J         |           | 7.4               | 31 |
| 3-Nitrotoluene             | <31           |           | 14                | 31 |
| Surrogate                  | %Rec          | Qualifier | Acceptance Limits |    |
| 1,2-Dinitrobenzene         | 0             | D         | 70 - 130          |    |

025/30/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW994

Lab Sample ID: 500-45521-10

Client Matrix: Water

Date Sampled: 04/14/2012 1200

Date Received: 04/17/2012 1230

### 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-148612 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-146956     | Initial Weight/Volume: 770 mL |
| Dilution: 500                  |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 05/04/2012 0935 | Run Type: DL               | Injection Volume: 100 uL      |
| Prep Date: 04/19/2012 1030     |                            | Result Type: PRIMARY          |

| Analyte               | Result (ug/L) | Qualifier | MDL | RL  |
|-----------------------|---------------|-----------|-----|-----|
| 2,4,6-Trinitrotoluene | 1300          |           | 18  | 80  |
| 2,6-Dinitrotoluene    | 2700          |           | 36  | 160 |

025/30/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW994

Lab Sample ID: 500-45521-10

Client Matrix: Water

Date Sampled: 04/14/2012 1200

Date Received: 04/17/2012 1230

### 8330 Nitroaromatics and Nitramines (HPLC)

|                  |                 |                 |            |                        |           |
|------------------|-----------------|-----------------|------------|------------------------|-----------|
| Analysis Method: | 8330            | Analysis Batch: | 500-148612 | Instrument ID:         | INST39-40 |
| Prep Method:     | 3535            | Prep Batch:     | 500-146956 | Initial Weight/Volume: | 770 mL    |
| Dilution:        | 1000            |                 |            | Final Weight/Volume:   | 6.0 mL    |
| Analysis Date:   | 05/04/2012 1209 | Run Type:       | DL2        | Injection Volume:      | 100 µL    |
| Prep Date:       | 04/19/2012 1030 |                 |            | Result Type:           | PRIMARY   |

| Analyte            | Result (ug/L) | Qualifier | MDL | RL  |
|--------------------|---------------|-----------|-----|-----|
| 2,4-Dinitrotoluene | 6800          |           | 32  | 310 |

05/30/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW994

Lab Sample ID: 500-45521-10

Date Sampled: 04/14/2012 1200

Client Matrix: Water

Date Received: 04/17/2012 1230

### 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-148612 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-146956     | Initial Weight/Volume: 770 mL |
| Dilution: 2000                 |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 05/04/2012 1355 | Run Type: DL3              | Injection Volume: 100 µL      |
| Prep Date: 04/19/2012 1030     |                            | Result Type: PRIMARY          |

| Analyte        | Result (ug/L) | Qualifier | MDL | RL  |
|----------------|---------------|-----------|-----|-----|
| 4-Nitrotoluene | 22000 5       |           | 160 | 620 |

QES/30/12

## Analytical Data

Client: Toltest Inc.

Job Number: 500-45521-1

Client Sample ID: JP-M06-GWMW994

Lab Sample ID: 500-45521-10

Date Sampled: 04/14/2012 1200

Client Matrix: Water

Date Received: 04/17/2012 1230

### 8330 Nitroaromatics and Nitramines (HPLC)

|                                |                            |                               |
|--------------------------------|----------------------------|-------------------------------|
| Analysis Method: 8330          | Analysis Batch: 500-148612 | Instrument ID: INST39-40      |
| Prep Method: 3535              | Prep Batch: 500-146956     | Initial Weight/Volume: 770 mL |
| Dilution: 5000                 |                            | Final Weight/Volume: 6.0 mL   |
| Analysis Date: 05/07/2012 1515 | Run Type: DL4              | Injection Volume: 100 uL      |
| Prep Date: 04/19/2012 1030     |                            | Result Type: PRIMARY          |

| Analyte        | Result (ug/L) | Qualifier | MDL | RL   |
|----------------|---------------|-----------|-----|------|
| 2-Nitrotoluene | 35000         |           | 410 | 1600 |

05/30/12

LDC #: 27649C40

**VALIDATION COMPLETENESS WORKSHEET**

SDG #: 500-45521-1

Level III

Laboratory: Test America, Inc.

Date: 5/23/12

Page: 1 of 1

Reviewer: AA

2nd Reviewer:

**METHOD:** HPLC Explosives (EPA SW 846 Method 8330)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

|       | Validation Area                      |                | Comments   |
|-------|--------------------------------------|----------------|--|
| I.    | Technical holding times              | A              | Sampling dates: 4/14/12 - 4/15/12                  |
| II.   | Initial calibration                  | A              | 1. RSD $\leq$ 20%.                                 |
| III.  | Calibration verification/ICV         | A              | 1-D $\leq$ 20%, 100/cov                            |
| IV.   | Blanks                               | A              |  |
| V.    | Surrogate recovery                   | SW             |  |
| VI.   | Matrix spike/Matrix spike duplicates | N              |  |
| VII.  | Laboratory control samples           | <del>ASW</del> | LCS/D  |
| VIII. | Target compound identification       | N              |  |
| IX.   | Compound quantitation/RL/LOQ/LODs    | <del>SW</del>  |  |
| X.    | System Performance                   | N              |  |
| XI.   | Overall assessment of data           | A              |  |
| XII.  | Field duplicates                     | SW             | ** FD <sub>1</sub> = 1, 7 FD <sub>2</sub> = 11, 15 |
| XIII. | Field blanks                         | <del>ND</del>  | SB =   |

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

\*\*ND

|    |                               |    |                              |    |          |    |  |
|----|-------------------------------|----|------------------------------|----|----------|----|--|
| 1  | JP-M06-GWMW123R               | 11 | JP-M06-GWMW652               | 21 | 146956MB | 31 |  |
| 2  | JP-M07-GWMW124R               | 12 | <del>JP-M06-GWMW652DL</del>  | 22 |          | 32 |  |
| 3  | JP-M06-GWMW162R               | 13 | JP-M06-GWMW652DL2            | 23 |          | 33 |  |
| 4  | JP-M06-GWMW212R               | 14 | <del>JP-M06-GWMW652DL3</del> | 24 |          | 34 |  |
| 5  | <del>JP-M06-GWMW212RDL</del>  | 15 | JP-M06-GWMW994               | 25 |          | 35 |  |
| 6  | <del>JP-M06-GWMW212RDL2</del> | 16 | <del>JP-M06-GWMW994DL</del>  | 26 |          | 36 |  |
| 7  | JP-M06-GWMW995                | 17 | JP-M06-GWMW994DL2            | 27 |          | 37 |  |
| 8  | JP-M06-GWMW313                | 18 | JP-M06-GWMW994DL3            | 28 |          | 38 |  |
| 9  | JP-M06-GWMW318                | 19 | <del>JP-M06-GWMW994DL4</del> | 29 |          | 39 |  |
| 10 | JP-M06-GWMW319                | 20 |                              | 30 |          | 40 |  |

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

# VALIDATION FINDINGS WORKSHEET

METHOD: GC / HPLC

| 8310                      | 8330                          | 8151                 | 8141                | 8141(Con't)           | 8021B             |
|---------------------------|-------------------------------|----------------------|---------------------|-----------------------|-------------------|
| A. Acenaphthene           | A. HMX                        | A. 2,4-D             | A. Dichlorvos       | V. Fensulfothion      | V. Benzene        |
| B. Acenaphthylene         | B. RDX                        | B. 2,4-DB            | B. Mevinphos        | W. Bolstar            | CC. Toluene       |
| C. Anthracene             | C. 1,3,5-Trinitrobenzene      | C. 2,4,5-T           | C. Demeton-O        | X. EPN                | EE. Ethyl Benzene |
| D. Benzo(a)anthracene     | D. 1,3-Dinitrobenzene         | D. 2,4,5-TP          | D. Demeton-S        | Y. Azinphos-methyl    | SSS. O-Xylene     |
| E. Benzo(a)pyrene         | E. Tetral                     | E. Dinoseb           | E. Ethoprop         | Z. Coumaphos          | RRR. MP-Xylene    |
| F. Benzo(b)fluoranthene   | F. Nitrobenzene               | F. Dichlorprop       | F. Naled            | AA. Parathion         | GG. Total Xylene  |
| G. Benzo(g,h,i)perylene   | G. 2,4,6-Trinitrotoluene      | G. Dicamba           | G. Sulfotep         | BB. Trichloronate     |                   |
| H. Benzo(k)fluoranthene   | H. 4-Amino-2,6-dinitrotoluene | H. Dalapon           | H. Phorate          | CC. Trichlorinate     |                   |
| I. Chrysene               | I. 2-Amino-4,6-dinitrotoluene | I. MCP               | I. Dimethoate       | DD. Trifluralin       |                   |
| J. Dibenz(a,h)anthracene  | J. 2,4-Dinitrotoluene         | J. MCPA              | J. Diazinon         | EE. Def               |                   |
| K. Fluoranthene           | K. 2,6-Dinitrotoluene         | K. Pentachlorophenol | K. Disulfoton       | FF. Prowl             |                   |
| L. Fluorene               | L. 2-Nitrotoluene             | L. 2,4,5-TP (silvex) | L. Parathion-methyl | GG. Ethion            |                   |
| M. Indeno(1,2,3-cd)pyrene | M. 3-Nitrotoluene             | M. Silvex            | M. Ronnel           | HH. Famphur           |                   |
| N. Naphthalene            | N. 4-Nitrotoluene             |                      | N. Malathion        | II. Phosmet           |                   |
| O. Phenanthrene           | O. Nitroglycerin              |                      | O. Chlorpyrifos     | JJ. Tetrachlorvinphos |                   |
| P. Pyrene                 | P.                            |                      | P. Fenthion         | KK. Demeton (total)   |                   |
| Q.                        | Q                             |                      | Q. Parathion-ethyl  |                       |                   |
| R.                        |                               |                      | R. Trichlorinate    |                       |                   |
| S.                        |                               |                      | S. Merphos          |                       |                   |
|                           |                               |                      | T. Stirofos         |                       |                   |
|                           |                               |                      | U. Tokuthion        |                       |                   |

Notes:

METHOD: GC / HPLC

Are surrogates required by the method? Yes ☒ or No ☐

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Were surrogates spiked into all samples and blanks?

| Study | Did all surrogate recoveries (%R) meet the QC limits? |
|-------|---|
| Y/N   | N/A   |

[illegible]



LDC#: 27649C40

# VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: 1 of 1  
Reviewer: AA  
2nd Reviewer: de

METHOD: HPLC Explosives (EPA SW 846 Method 8330)

☒ Y ☐ N ☐ NA  
☒ Y ☐ N ☐ NA

Were field duplicate pairs identified in this SDG?

Were target analytes detected in the field duplicate pairs?

| Analyte | Concentration (ug/L) |      | (≤ 25)<br>RPD | (ug/L)<br>Difference | Qualifications<br>(Parent Only) |
|---------|----------------------|------|---------------|----------------------|---------------------------------|
|         | 11                   | 15   |               |                      |                                 |
| D       | 9.5                  | 7.9  |               | 1.6<br>(limit 580)   | No Qual.                        |
| G       | 1600                 | 1300 | 21            |                      | ↓                               |
| J       | 8400                 | 6800 | 21            |                      |                                 |
| K       | 3300                 | 2700 | 20            |                      |                                 |
| I       | 360                  | 320  | 12            |                      |                                 |
| H       | 380                  | 320  | 17            |                      |                                 |

| Analyte | Concentration (ug/L) |       | (≤ 25)<br>RPD | (ug/L)<br>Difference | Qualifications<br>(Parent Only) |
|---------|----------------------|-------|---------------|----------------------|---------------------------------|
|         | 11                   | 15    |               |                      |                                 |
| L       | 44000                | 35000 | 23            |                      | No Qual                         |
| N       | 28000                | 22000 | 24            |                      | ↓                               |
|         |                      |       |               |                      |                                 |
|         |                      |       |               |                      |                                 |
|         |                      |       |               |                      |                                 |
|         |                      |       |               |                      |                                 |